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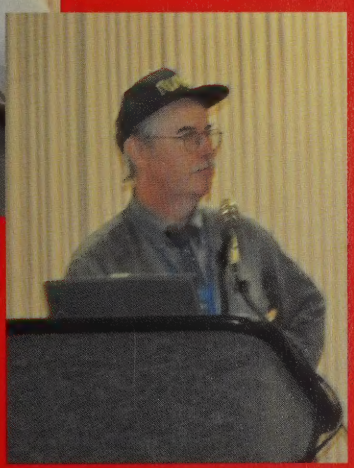

SPEAKERS AT THE ATV HAMVENTION MEETING

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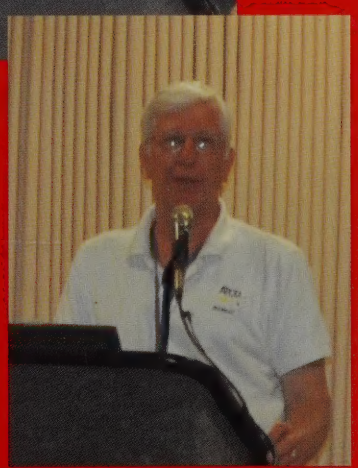

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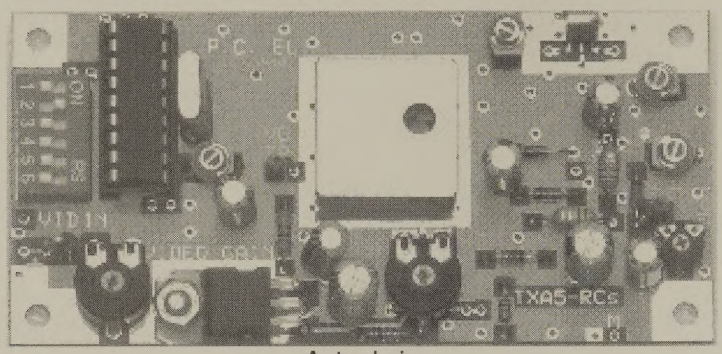

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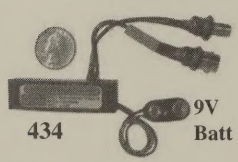

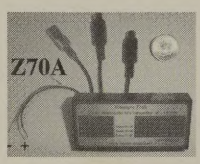

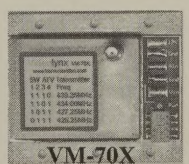

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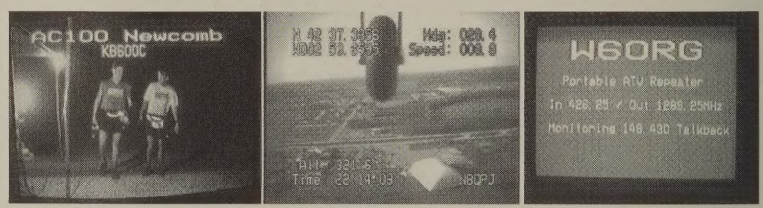

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Amateur Television Quarterly

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Communications For Hire Or For Material Compensation

To All Amateur Radio Volunteers,

I contacted Mr. Steve Ewald, Supervisor, of ARRL's Filed Organization Team seeking clarification regarding the prohibition of compensation or remuneration for ham radio services. Specifically, whether or not Amateur Radio operators may accept any form of compensation, gratuity, or gift which may be offered by event organizers.

His answer is below.

Given his advice, we are now at liberty to accept incidental tokens of appreciation which may be offered by event organizers.

73,

John Cotner, Jr. - KC9IED EC/IL ARRL
Amateur Radio Emergency Service, (A.R.E.S.)

——— Original Message ———

Hello, John.

I checked with Dan Henderson, N1ND, the ARRL Regulatory Information Manager, and he reports that is all right for Amateur Radio operators to accept small tokens of appreciation - like a tee-shirt, or a drinking cup or a snack or light meal or drink while the radio amateurs are helping a group or organization in a public service event. Apparently, these token items are just considered incidental items and are not considered "compensation" in any way or form for transmitting messages over Amateur Radio.

Sometimes wearing tee-shirts during an event is a sort of a uniform and allows event participants to know that the person wearing a tee-shirt is associated with the event. That could be very helpful to all concerned. After the event, there is no reason to turn the tee-shirt back in. Everyone (participant and volunteer) is encouraged to keep these items as souvenirs.

I hope this helps. Thanks for writing.

73,

Steve Ewald, WV1X
Supervisor, Field Organization Team

ARRL - The national association for Amateur Radio
860-594-0265
sewald@arrl.org

ATVQ

ATN Summer Meeting and Newsletter Announcement

ATN-CA Repeater update news for ATVQ

Santiago:
Santa Barbara link is back up and operational.
Weak signal source QRM that has keyed up Santiago has been located and the problem fixed.

Point Loma:
Point Loma link has been installed and operational.

Snow Peak link transmitter has been fixed and will re-installed next week.

Mt. Wilson: 2441.5 MHz receiver system is installed and working, adding additional port to the controller his week.

This will complete all ATN-CA repeaters with both 434 and 2441.5 MHz inputs.

New ATN controllers: **Point Loma** will have one installed in July and **Santiago Peak** by late summer.

Oat Mt. Weed adbaitment party June 18th was done with the help of Bob W6KGE, Spencer N6IWY, and Allan W6IST Thanks for your efforts to keep the site clean and provide a defensible space in case of a brush fire!

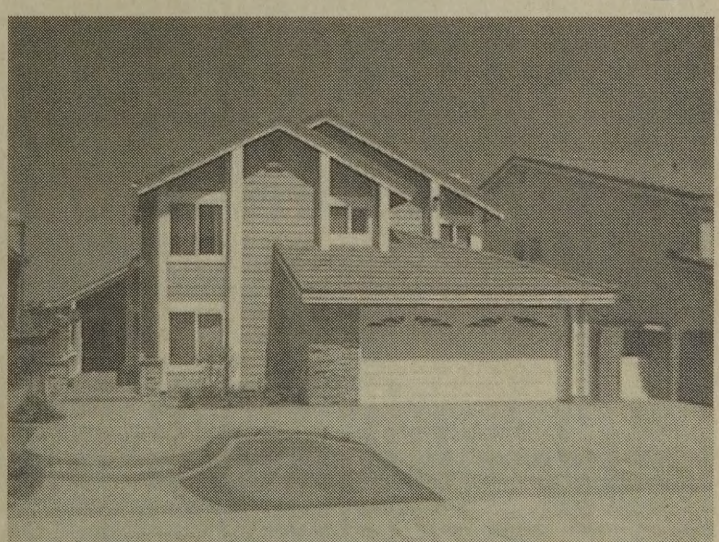
ATN Summer Meeting will be Aug 23, 2008 at 11:00am - ??

Location is Don Hill's (KE6BXT) QTH:

27271 Regio, Mission Viejo, CA

There is a new chapter of the ATN in Washington state, the KD6ILO repeater and the W7TED repeater.

ATVQ



Using Directional Couplers

By: Harold Kinley,

Many RF test and measurement applications require the use of directional couplers, whether standalone or as an integral part of test instruments such as directional wattmeters. Typically, a directional coupler is a four-port device; the ports might be labeled input, output, forward and reverse. A four-port coupler also is called a bidirectional coupler. Important specifications for directional couplers are main line insertion loss, frequency range, coupling factor, directivity, coupling flatness and maximum power input.

The main line loss is the insertion loss between the input and output ports. If a 50-ohm termination were connected to both the forward (FOR) and reverse (REV) ports, the main line loss would be the same in either direction — from input to output or from output to input. If a 50-ohm termination were connected to only one of the coupled ports, either FOR or REV, the main line loss no longer would be the same in either direction. However, for higher coupling factors, say 20-30 dB or so, the difference between the losses in opposite directions is negligible in practical applications. The coupled port that is terminated with a 50-ohm impedance becomes the isolated port. In a three-port directional coupler (as opposed to a bidirectional coupler) the fourth port is not made available externally but is terminated internally in a 50-ohm resistor. An internal termination generally provides a better impedance match and results in a better directivity figure.

The theoretical minimum insertion loss depends on the degree of coupling between the main line and the coupled port(s). Higher coupling factors will cause less insertion loss in the main line. For example, a coupling factor of 30 dB will cause less insertion loss than a coupling factor of 20 dB. The formula for determining the minimum main line insertion loss is:

$$I_L = 10\log\left(1 - 10^{\left(\frac{-C}{10}\right)}\right)$$

For 20 dB coupling and substituting 20 for C in the formula yields a figure of 0.044 dB. For 30 dB coupling the figure is 0.0043 dB. Coupling affects the main line insertion loss from input to output because any signal appearing at the coupled port(s) is taken from the signal at the input on the main line.

The coupling factor determines the level of the signal attenuation between input and the coupled port associated with the input, or between the output and the coupled port associated with the output.

Referring to Figure 1 and assuming a coupling factor of 20 dB, if a signal at a level of 0 dBm is applied to the input, the level appearing at the FOR coupled port will be -20 dBm. If the connections to the signal generator and the RF voltmeter were reversed, the RF voltmeter would still indicate -20 dBm; that is, the coupling between the input and forward ports is bidirectional. The output and reverse ports are terminated in 50 ohms. It is always a good practice to terminate unused ports in 50 ohms (assuming a 50-ohm system). Referring again to Figure 1, the signal generator could be connected to the output port and the RF voltmeter to the reverse port and the results would be the same. Again, unused ports are terminated in 50 ohms.

Directivity is one of the most important characteristics or specifications of directional couplers. Directivity can best be defined by an example. The setup in Figure 2 is the same as Figure 1, except the RF voltmeter is now connected to the reverse port and the forward port is terminated in 50 ohms. The RF voltmeter now indicates much less than -20 dBm. The signal level at the reverse port will be equal to the input signal level minus the coupling factor minus the directivity. If the coupling factor is 20 dB and directivity is 30 dB, the signal level at the reverse port will be equal to the input signal level (0 dBm) minus 50 dB, or -50 dBm. This assumes a perfect 50-ohm match at the output port. If the output port were left open (unterminated), the RF voltmeter would indicate -20 dBm because the signal power is completely reflected back into the output port and coupled (with a 20dB loss) to the reverse port.

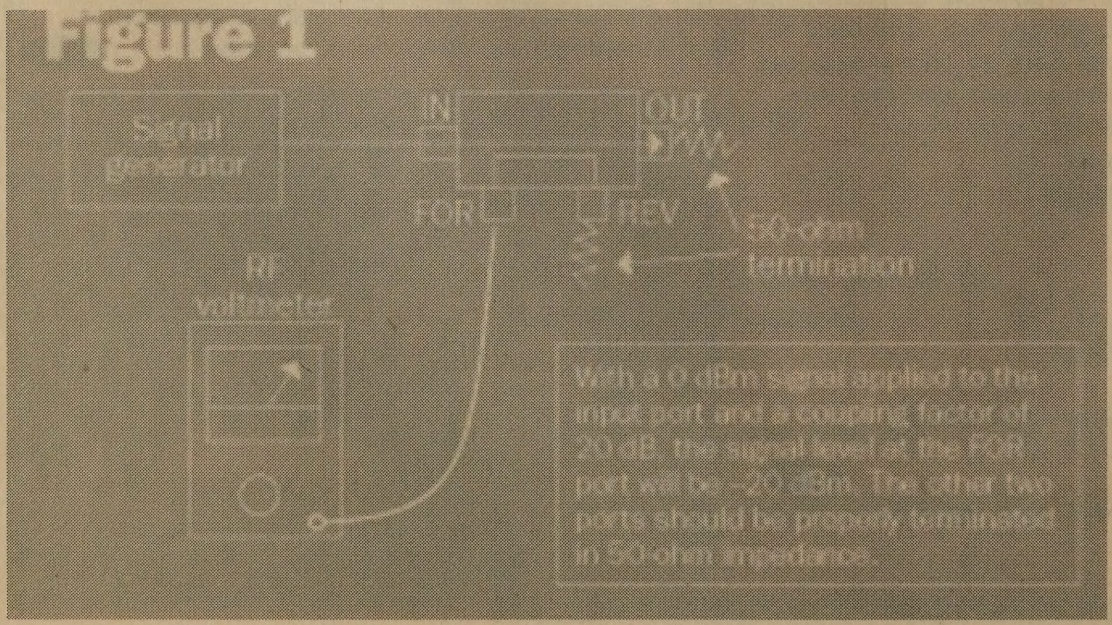
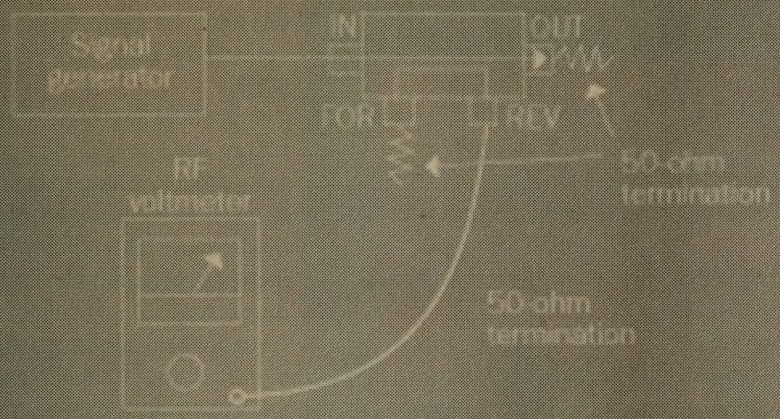


Figure 2



With this test setup the RF voltmeter will indicate a signal level equal to the input signal level minus the coupling factor minus the directivity of the coupler. If the coupling factor is 20 dB and the directivity is 30 dB, the RF voltmeter will indicate –50 dBm if the input signal level is 0 dBm. This assumes a good impedance match at the output port and the forward port.

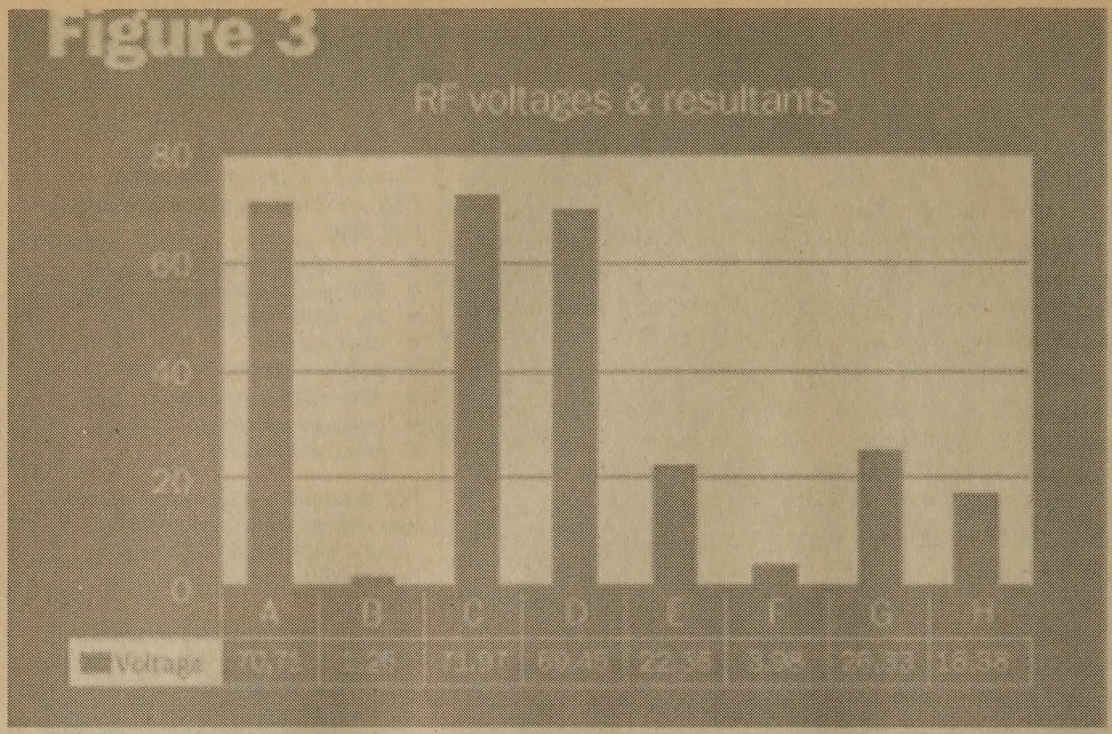
It is easy to see why directivity is such an important characteristic if the directional coupler is to be used to compare forward and reflected power, as it is in a directional wattmeter. To better understand how coupler directivity affects the accuracy of a wattmeter, refer to Figure 3. The graph is based on a directional coupler having a directivity of 25 dB with a forward power of 100 W at the input and a reflected power of 10 W at the output.

A portion of the signal power from the reverse signal is mixed with the forward signal power and vice versa. In a directional wattmeter, these "contaminant" signals cause errors in the measurement of forward and reflected power. Normally, the forward power reading is not significantly affected by the contaminant because the forward power is usually much higher than the reflected power. However, the reflected power reading can be seriously affected by the contaminant from the forward signal. This is especially true at relatively low reflected power levels.

To determine the effect of these contaminants, the power levels are converted to voltage levels (in 50 ohms) and then analyzed using phasors. Figure 4 shows the various voltages and the resultants. The voltage at A represents the voltage in the 100 W forward signal. The voltage at E represents the voltage in the 10 W reflected signal. The voltage in the contaminant signal that is 25 dB down from the reflected voltage (E) is shown at B. At one point, the phasors representing the desired and contaminant signals will be in phase and will add directly. This is shown at C. At another point, the phasors will be 180° out of phase and will subtract directly. This is shown at D. At other phase relationships, the voltages will be combined vectorially and will fall between these two extremes. Similarly, a contaminant from the forward signal is shown at F and is 25 dB down from A. The sum and difference of E and F produces the resultants G and H.

As mentioned earlier, some directional couplers provide only three ports. In this case, the third port is simply labeled the "coupled" port instead of forward or reverse. The fourth port is terminated internally with a near-perfectly matched 50-ohm resistor. In this case, the fourth port is not available externally and therefore is not really considered a port, as such.

The obvious disadvantage of this arrangement is that a sample of both the forward and reflected signals is not available simultaneously. Connections have to be switched to measure one and



changes over a specified frequency range with the signal level at the input port held constant. An example might be ±0.5 dB from 5 to 300 MHz.

Figure 4 shows a typical use for a three-port directional coupler. Directional couplers can be used for a variety of test-and-measurement procedures. As a rule of thumb, when using a directional coupler to measure voltage standing wave ratio (VSWR), the directivity of the coupler should be at least 20 dB greater than the return loss (VSWR) to be measured. For example, if the return loss to be measured is 20 dB, the directivity of the coupler should be no less than 40 dB. When this is the case, the measurement error will be no greater than 1 dB.

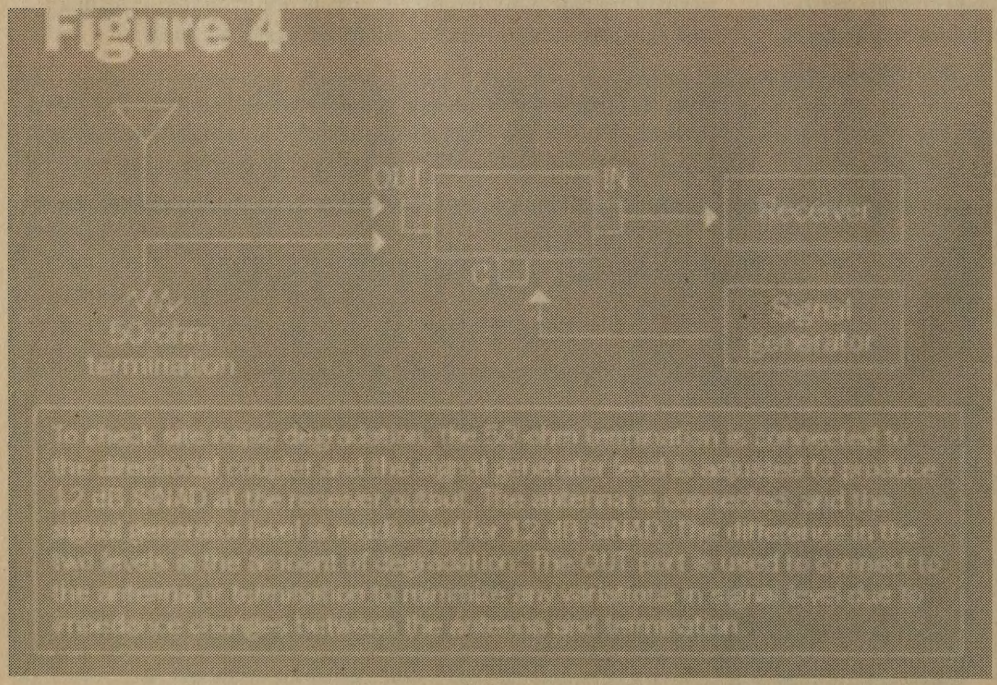
then the other. Directivity measurement requires a comparison of the signal level at the coupled port with the signal generator and load connected to the input and output ports respectively, and then with the generator and load connections reversed.

Dual-directional couplers can be fashioned by connecting two three-port couplers back to back. The two output ports are connected together. This provides two coupled ports that can be used for simultaneous monitoring of the forward and reflected signals. The two remaining ports are both labeled "input," but either can be used as input or output.

Coupling flatness is sometimes referred to as frequency sensitivity. It is a measure of how much the level at the coupled port

Understanding how directional couplers operate is the key to getting maximum benefit from their use. The material presented here should serve as a primer on the use of directional couplers. However, much can be learned by hands-on experimentation with a directional coupler. Some directional couplers are designed for high-power applications — others are not. Just remember, don't apply power in excess of the manufacturer's rating — otherwise, you'll let the smoke out!

Until next time — stay tuned!



ATVQ

When Measurements Aren't Feasible

By: Jay M. Jacobsmeyer, P.E.

In the absence of drive test measurements, one of the first steps in designing a new land mobile radio system is to model coverage from prospective sites and, through trial and error, find the smallest number of sites that meets the coverage requirement. Alternatively, one may start with a fixed budget and design for the best overall coverage the budget allows.

Before we jump into the morass of propagation models, let's make it clear that we are interested only in models for land mobile radio propagation at frequencies greater than 30 MHz. This means that models for point-to-point microwave, tropospheric scatter, satellite, AM groundwave and HF skywave are outside the scope of this discussion.

The land mobile radio channel is rarely line-of-sight, and the received signal is the sum of many reflected and diffracted signals. "Multipath fading" describes the time-varying amplitude and phase that characterize the composite signal at the receiver. Because mobile radio receivers are designed to operate in multipath fading mode with a minimum mean amplitude, we are more interested in modeling the mean signal, not the rapid fluctuations caused by fading.

The mean signal amplitude is a function of many factors, including free space loss, terrain loss and clutter loss. At the frequencies used for land mobile radio, we can usually ignore losses due to precipitation and atmospheric absorption.

Most propagation models assume that the minimum loss is free space loss. (See Equation 1.) Other losses are added to the free space loss to estimate the total path loss. This assumption normally is sound, but one exception is the so-called waveguide effect in urban areas, where tall buildings on either side of the street act as a waveguide resulting in a path loss that actually is less than free space loss.

Free space loss is easy to compute, so the real problem is to predict the losses due to terrain and clutter. Let's first address each of these losses and then examine some popular computer models used to predict them.

Terrain loss and digital terrain databases

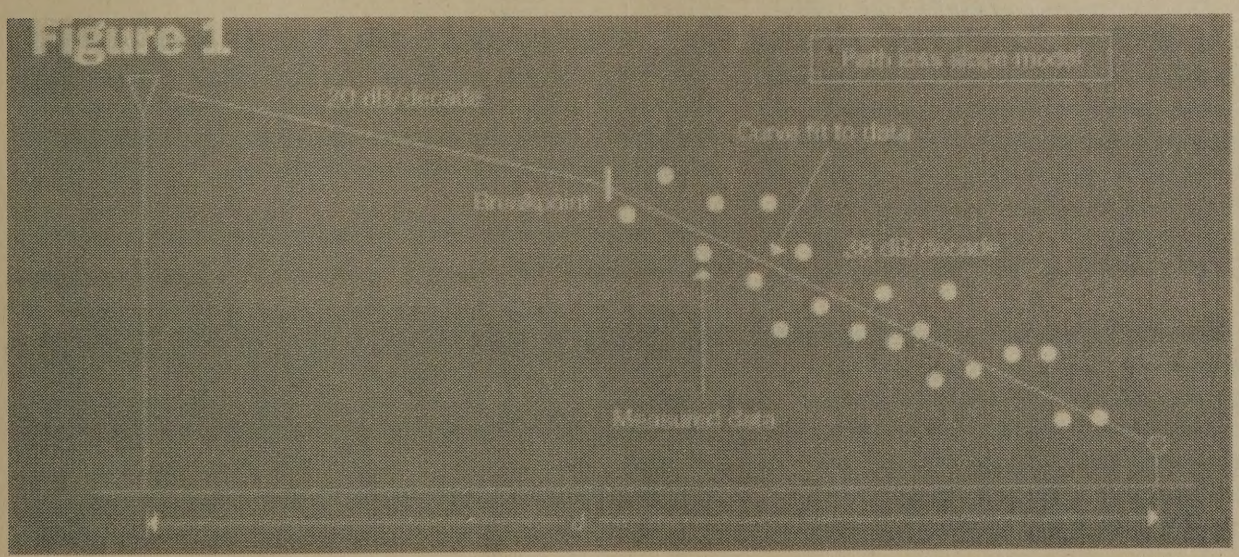
Terrain loss is primarily diffraction loss, which most models estimate using principles of ray optics. Engineers working at the National Bureau of Standards did much of the work in this area in the late 1950s and early 1960s. The definitive reference for this topic is NBS Technical Note 101, published in 1967. The model described by this note includes the geometry of diffraction as well as the roundness of the obstacle. More advanced models also use the conductivity of the soil, if it is known.

NBS Technical Note 101 does a good job of predicting diffraction loss over isolated obstacles; however, obstacles often appear back-to-back, and simply summing the loss from all obstacles results in an overly conservative prediction. A popular method for sorting out the best way to treat multiple obstacles is the Epstein-Peterson method, which is well-suited for computer models that use digital terrain databases.

A computerized diffraction model is of little use without a digital terrain database. There are several from which to choose — some very coarse and others very fine. In the U.S., the earliest digital terrain databases were the National Geophysical Data Center (NGDC) 30-arc-second and 3-arc-second databases. One pitfall of these databases is that both are taken from the same coarse maps. In other words, the 3-second database is simply a more finely sampled version of the 30-second database. In mountainous terrain, large elevation errors from these databases are likely to occur.

In the early days of personal computers, better-quality terrain data were not available, and even if it were, a sampling finer than 3 arc seconds resulted in unwieldy databases and painfully slow computing. Over the last 10 years, much more accurate terrain data have became available in the form of the 30-meter terrain database, which is

Figure 1



Equation 1

$$22 + 20 \log_{10}(d/\lambda)\ dB$$

Where d is the path distance and λ is the wavelength of the radio carrier.

extracted from the 1:24,000 scale, 7.5 minute "quad" maps popular with hikers. Modern propagation studies should be done with the 30-meter database or its equivalent, if at all possible.

Clutter loss

Clutter loss falls into two categories: foliage and man-made. Foliage loss is computed from a database of loss factors that are a function of both radio frequency and the type of foliage. Man-made clutter includes buildings, vehicles and bridges. Man-made clutter loss usually is calculated from a clutter database, which applies a clutter category to individual tiles (cells) in the geographical area under study.

Equation 2

$$L_{50}(urban)(dB) = 69.55 + 26.16 \log f_c - 13.82 \log h_{te} - a(h_{re}) + (44.9 - 6.55 \log h_{te}) \log d$$

f_c is the frequency in MHz (150-1500 MHz)
h_{te} is the effective transmitter antenna height in meters
h_{re} is the effective receiver antenna height in meters
d is the path distance in km
$a(h_{re})$ is the correction factor for h_{re}, based on the coverage area

Typical clutter categories include dense urban, urban, suburban, industrial, agricultural and rural. A common approach is to apply a single clutter loss factor corresponding to the tile of interest, regardless of the antenna height of the base station/repeater site. This relatively crude model can result in inaccuracies because it is not a function of antenna look angle. The steeper the look angle, the smaller the clutter loss and the shallower the look angle, the greater the clutter loss.

There are dozens of computer propagation models, but we will examine just two of the most popular: path loss slope and Okumura-Hata.

Path loss slope

The path loss slope is the exponent applied to the path distance. Free space loss has an exponent of 2 because received power is proportional to the inverse of distance squared. In the classic land mobile radio model, the theoretical path loss exponent is 4. Because radio engineers prefer to work in logarithms, the path loss exponent commonly is referred to as the path loss slope, with an exponent of 2 equal to a slope of 20 (20 dB per decade).

In the cellular radio industry, it is common to fit drive test data to the slope of a straight line (on a log scale) and to use this model for network planning. A common variation of the path loss slope model is the two-slope breakpoint model where a slope of 20 is used from the cell site antenna to the height of the first clutter (assuming the cell site antenna is above clutter). Then, a curve-fitted slope is used from that point to the mobile radio. This concept is illustrated in Figure 1, where the calculated path loss slope after the breakpoint is 38 dB per decade.

Why would a wireless operator use such a crude model when more sophisticated models are available? The reason lies with the relatively poor accuracy of propagation models. Because most of the path loss in cellular radio networks is due to clutter and clutter databases are necessarily crude, it is nearly impossible to predict signal level with accuracy better than +/- 6 dB (standard deviation). In other words, it makes no sense to measure with a micrometer if you are going to cut with a chain saw.

Okumura-Hata

Most land mobile radio propagation models use some variation of Okumura-Hata. (Other popular models include Longley-Rice — often used by the FCC — TIREM, and ray-tracing.) Okumura conducted an extensive set of propagation measurements in the Tokyo metropolitan area in the late 1960s. From these measurements he developed a set of curves giving the median attenuation relative to free space in an urban area over quasi-smooth terrain.

In 1980, Hata published an extension to Okumura's model that is suitable for computer applications. Okumura-Hata is a statistical model in the sense that actual terrain or clutter is not used in the calculation. Instead, the model computes the path loss as a function of the transmit and receive antenna heights, path distance, radio frequency, and the type of clutter (urban, suburban or open). See Equation 2 for the Okumura-Hata median path loss in urban areas. Correction factors are applied to this basic equation for suburban areas. Common standard deviations between Okumura-Hata predictions and measured path loss are 10-14 dB. For more on the Okumura-Hata equation, see Wireless Communications Principles and Practice by Theodore S. Rappaport.

Jay Jacobsmeyer is president of Pericle Communications Co., a consulting engineering firm in Colorado Springs, Colo. He holds BS and MS degrees in electrical engineering from Virginia Tech and Cornell University, respectively, and has more than 25 years of experience as a radio frequency engineer.

ATVQ

FM ATV TRANSMITTER ALIGNMENT PROCEDURES

By Mike Collis, WA6SVT Email: WA6SVT@aol.com
POB 1594
Crestline, CA 92325

I am writing this article to clear up how to properly set up modulation on your FM ATV transmitter. This information is out there, some good and some not. So with my many years experience with broadcast television as a microwave and transmitter engineer, I wanted to share the basic procedures involved.

Flat, pre-emphasis what is this about? The easiest way to run FM is flat response from vertical sync through the highest audio subcarrier frequency but much better signal to noise ratios with weaker signals can be had by pre-emphasizing the transmitter and de-emphasis in the receiver. Is all emphasis the same? No it is not. Most FM TV systems use CCIR 405-1 that elevates the video signal slowly above a few hundred KHz then much faster near 1 MHz then slowly again near the top of the video or baseband pass band in the transmitter (pre-emphasis) and just the opposite in the receiver (de-emphasis).

Due to the nature of cheap consumer electronics (video senders etc) not all manufactures follow CCIR 405-1 as close as they should, some are also set for 525 line NTSC and others for 625 line PAL. How do you know if your emphasis is correct? If you have a video test generator, run the "window" pattern through your transmitter and look at the video from the receiver with a scope or waveform monitor and if it is correct, the wave form should be square. This is a good way to test transmitters like the Comtech after adding the pre-emphasis circuit (last issue of ATVQ) to see if you got it right.

Oh yeah, this article is about transmitter deviation adjustment so hear you go. In broadcast microwave as well as FM-ATV we should be using 4 MHz deviation and about 12 to14 MHz bandwidth channel depending on the subcarrier frequency used. In a crowded band with only a 10 MHz allocation we drop to 3 MHz deviation and only one subcarrier of 4.5 or 4.83 MHz.

Now how to do it! You have 2 choices, 1: Bessell (1st center carrier) null, 2: Calibrated receiver. The test equipment for method one is a spectrum analyzer, function generator and scope or waveform monitor. Equipment for method two is a calibrated receiver, function generator and a scope or waveform monitor.

Method one: Connect the transmitter though enough inline attenuation to not overload the analyzer. Connect the function generator to the transmitter via a tee connector to allow a scope or waveform monitor high impedance bridge the video line and the transmitter needs to be terminated (usually internally) at 75 ohms. Now set the generator for 2.33 MHz sine wave (no triangle or square wave) at 1 volt p-p as measured on the scope.

If adjustment is needed, start by turning down to minimum deviation then bring up the deviation and you should see many carriers at 2.33 MHz spacing above and below the video (center) carrier. As you increase the deviation the video carrier will reduce way down to a null with all the other carriers still present. Stop at this point, you are now at 4 MHz deviation for CCIR-405-1. Usually the subcarrier (s) are turned off but this is not easy to do with the consumer video so do not worry just leave it on as the error in transmitter deviation is very small for one or two subcarriers. While we are talking about subcarriers, the level should be -20 to -22 dB below the video carrier with no video (or function generator) signal present. Setting stronger than -20 dB and even more so with multiple subcarriers will cause intermodulation distortion to the video. Weaker subcarrier levels will reduce audio detection in weak signals and noisy or hissy audio on moderate signals.

3 MHz deviation the procedure is the same but the function generator is set for 1.61 MHz. Subcarrier level is usually set for -25 dB below video carrier to help reduce channel bandwidth.

Method two: Set up the function generator the same as method one, then in the case of a dual input scope connect the calibrated receiver the second input terminated in 75 ohms usually via another tee/75 ohm termination. And adjust the deviation control for 1 volt p-p. If you have a known calibrated receiver and no function generator, use a color bar or video test generator and adjust for 1 volt p-p. To calibrate a receiver for use as test equipment, you need to use method one setup.

If someone in your club or group has the equipment above, it is handy to bring over a receiver and calibrate it and now you can set your deviation at home with just a scope and known 1 volt p-p video source. Many ATV'ers use satellite receivers without the LNB for 900 and 1.2 GHz ATV adding a preamp and filter. Satellite receivers are not 4 MHz deviation standard! They are 11 MHz and will produce about 0.35 volts p-p with 4 MHz deviation transmitters. Running 11 MHz deviation on 900 and 1.2 GHz is not good amateur practice, leave room for others to use the band too. Many of the consumer modules like the Comtech boards use satellite tuner/demodulator modules in them (see last issue of ATVQ for the narrow IF filters modification).

Enjoy FM ATV

73,
Mike WA6SVT

Making Printed Circuit Boards At Home

By Paul Verhage - KD4STH Email: Paul.Verhage@boiseschools.org
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Nampa, ID 83686

Any electronic circuit, whether it's for amateur television, a robot, or near space, is far more reliable if assembled on a printed circuit board (PCB). No doubt, many ATV Quarterly readers have made their own PCBs. Some of them, like other electronics hobbyists today, design their PCBs using an online board house. The PCB design software these companies provide is free, and once you finish your design, the company will manufacture your PCB according to your design. The result is very professional with a solder mask and top silk lettering. However, I want to explain how you can make high quality PCBs at home in less time and for a fraction of the cost.

A friend at Kansas State University, Steve Kelly, introduced me to making PCBs back in 1997. Over the last eleven years, I've made hundreds of PCBs with the techniques I'll describe in the next two articles. The technique is so good that 99% of my PCBs were successfully produced. This PCB procedure consists of the software and hardware components described below. In this issue I'll explain using the software and next time you'll learn about the mechanical procedure.

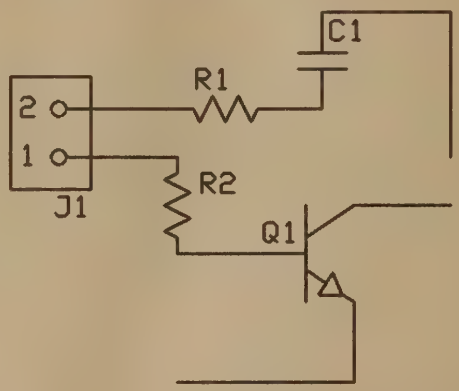
Ares Lite, the Software
There are several PCB CAD programs on the market for making homemade PCBs. What you cannot use however is online board house software, as they don't produce the clean copy of the artwork you will need (how can they give you free software unless you pay them to make your PCB). The software I use is Ares Lite by Labcenter Electronics.

I choose Ares Lite because it's inexpensive, but capable software. You can get an advanced version with all its bells and whistles, but for basic PCBs, it's not necessary. And don't think that Ares Lite is going to limit you. I've yet run into a PCB design I've wanted but couldn't design.

DALPro Products, the Hardware
The circuit boards used in this method are coated in a dry, pre-sensitized film. That means you won't be cleaning and coating copper clad with sensitizing liquid for this method. The boards are developed and etched with washing soda and sodium persulfate, very safe and clean to work with chemicals. DALPro even sells the chemicals in dry form. Their package of six 4" by 6" boards are ideal in size and cost.

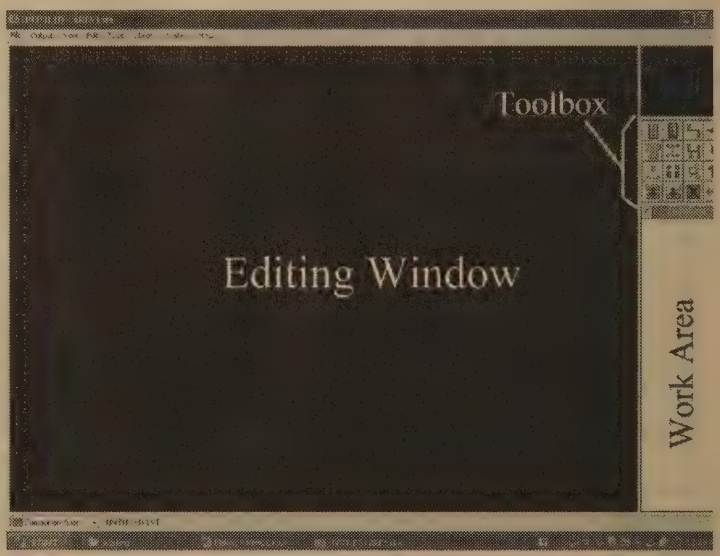
The Ultraviolet Table and Photographic Trays
The PCB design is transferred to the pre-sensitized board via exposure to ultraviolet light. The UV table is easy to make and will be explained next time. The exposed circuit board is developed and etched in plastic photographic trays, so purchase two inexpensive ones.

The Process
Let's create a simple PCB for the following schematic. It has a two pin headers, two resistors, a capacitor, and a transistor.



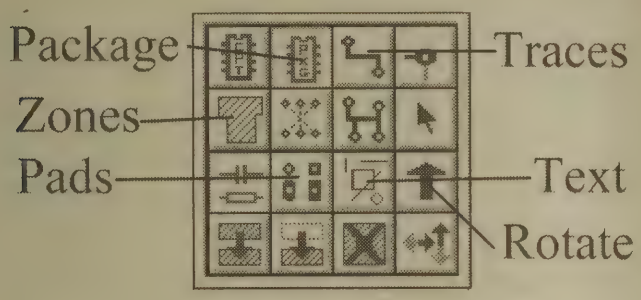
This circuit does nothing, we just want a simple circuit for your first printed circuit board

Step 1: Starting Ares Lite
Now start Ares Lite and you'll see this screen.



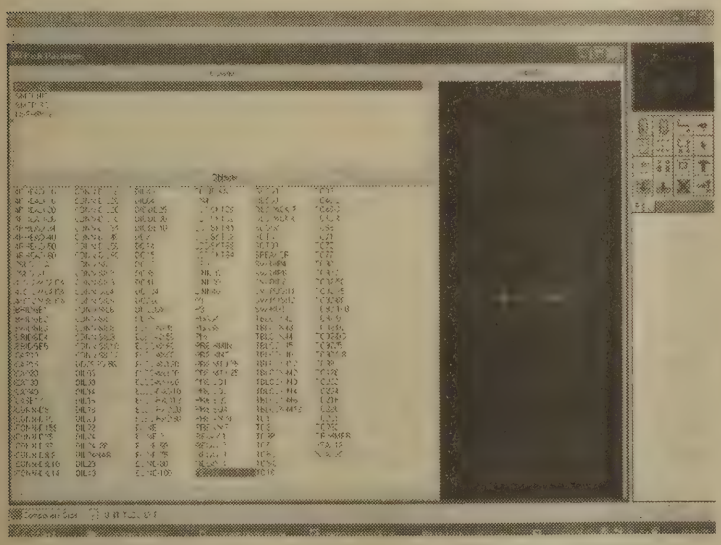
The Editing Window is where the action takes place, as the PCB is designed here. The Tool Box contains buttons for selecting the components, traces, ground plane, and text that goes into the Editing Window. Below the Tool Box is the Work Area, where various components, traces, and copper pads are available for selection. PCBs in the Editing Window are transparent; you can see the PCB's top and bottom surface simultaneously. Which side of the PCB you're currently working on is displayed in the window at the bottom left of Ares Lite, just below the Editing Window.

For the example in this article, we'll use the following buttons in the Tool Box; Package, Traces, Pads, and Zones.



A close up of the buttons in the Tool Box we'll be using for this example.

Step 2: Selecting Components
After starting up Ares Lite, click the Package Button in the Tool Box followed by the tiny button labeled P at the bottom of the Tool Box to bring up the Ares Lite database of packages.

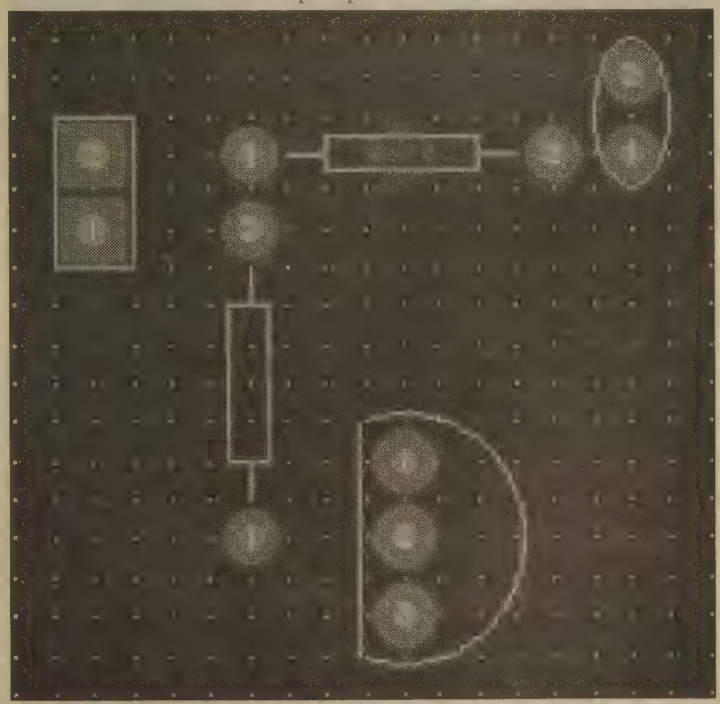


The list on components in the Ares Lite database covers the Editing Window. The list is in alphabetic order with names like, CAP20, DI28, ELEC-RAD30, and TO3. Click a component name once and its enlarged footprint becomes visible in the Editing Window, next to the components list. In the figure above, a 0.4 inch long, or a ¼ watt resistor, has been selected. Click the name twice and a copy of the component moves to the Work Area. In Ares Lite, you never pick the value of the component; components are selected based on their size. This makes sense when you realize that all ¼ watt resistors are the same size as are all transistors in the TO-92 form factor.

In Ares Lite, we'll pick the following components for our PCB.

RES40	¼ watt resistor with a 0.4" spacing between its bent leads
CAP10	small disk capacitor with a lead spacing of 0.1"
CONN-SIL2	two pin header, 0.1" between pins
TO92-100	transistor in a TO-92 form factor with a 0.1" spacing between its leads

Step 3, Putting Components into the Editing Window
Now that we have one of each type on of component in the Work Area, close the database window and begin placing components into the Editing Window. Note that we never take components from the database and place them in the Editing Window. It's far easier to pull parts from the Work Area.

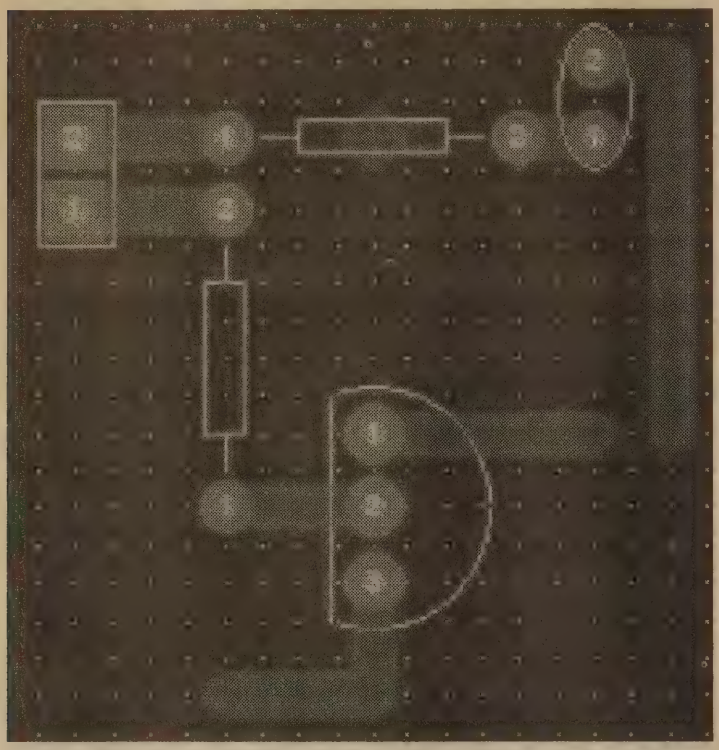


Ares Lite has a snap-to feature that causes components to snap to a 1/20 inch grid. In most PCBs, the distance between leads is 1/10 inches, therefore, place components so their leads are two squares apart. To do this, click the first component's name in the Work Area just once. The footprint of the component then shows up in the window above the Tool Box. Using the Rotate Button, rotate the component's foot print until it has the desired orientation. Each click of the Rotate Button rotates the component by 90 degrees.

Now click on the component, and while continuing to hold the left mouse button, drag it into the Editing Window. The component snaps to the nearest grid squares when you release it. If you make a mistake, a double right click on the component eras-

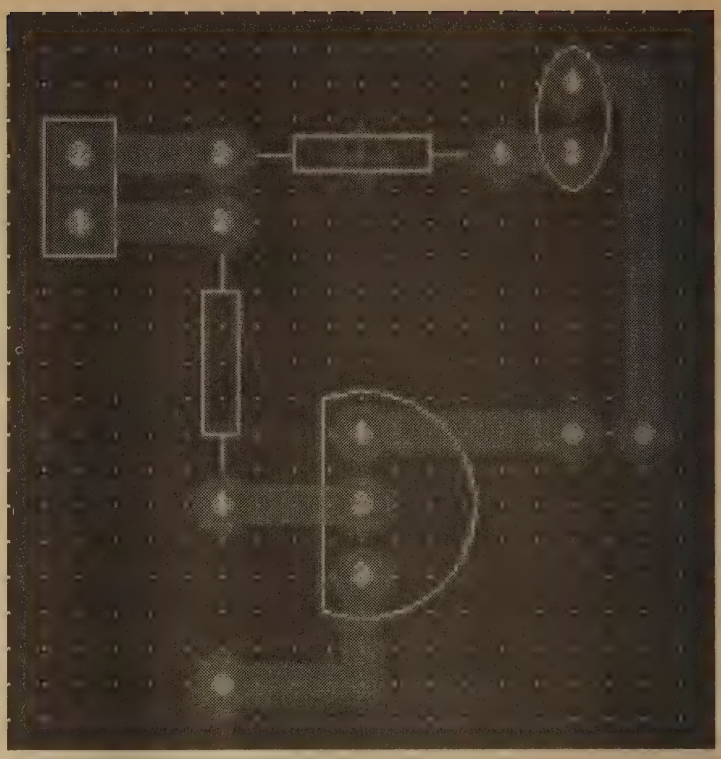
es it from the Editing Window, while still leaving the component in the Work Area for future use. The placed components are colored cyan because they lie on the top of the PCB. If they appear purple, they're on the wrong side, so switch layers in the lower left window before puling components out of the Work Area. Copies of components can be pulled from the Work Area as many times as necessary.

Step 4, Draw in the Copper Traces
Current won't flow through the components until we make copper traces to connect their pins. Traces are the flat copper lines running across the underside of the PCB. They terminate in pads where component leads are soldered.



Click the Trace Button and the Work Area fills with a table of available trace widths. I recommend that my students use a 50 mil wide trace (T50 in the list of traces), but have seen them successfully use traces as narrow as 8 mils (T8). Make sure the layer window at the lower left shows Bottom Copper before drawing traces (bottom copper traces are blue, top copper traces are red). Start a trace by clicking a component pad once. Traces want to be vertical, horizontal, or at 45 degree angles, therefore, move the mouse to a new location vertically, horizontally, or diagonally from the start point and click once again. This ties the trace to that point, but doesn't terminate it. Do not double click the mouse or the trace will terminate and move to the top layer of the PCB (turns red). To end the trace, use the right click. You can remove bad traces with a triple right click.

Step 5, Add the Proper Pads to Components
Some components, like ICs, don't come with the proper pads. The rest of the components have pads for both the top and bottom of the PCB and are colored light purple (something I'm not fond of). So we'll change the pads of components to just the bottom copper and add the missing pads to ICs.



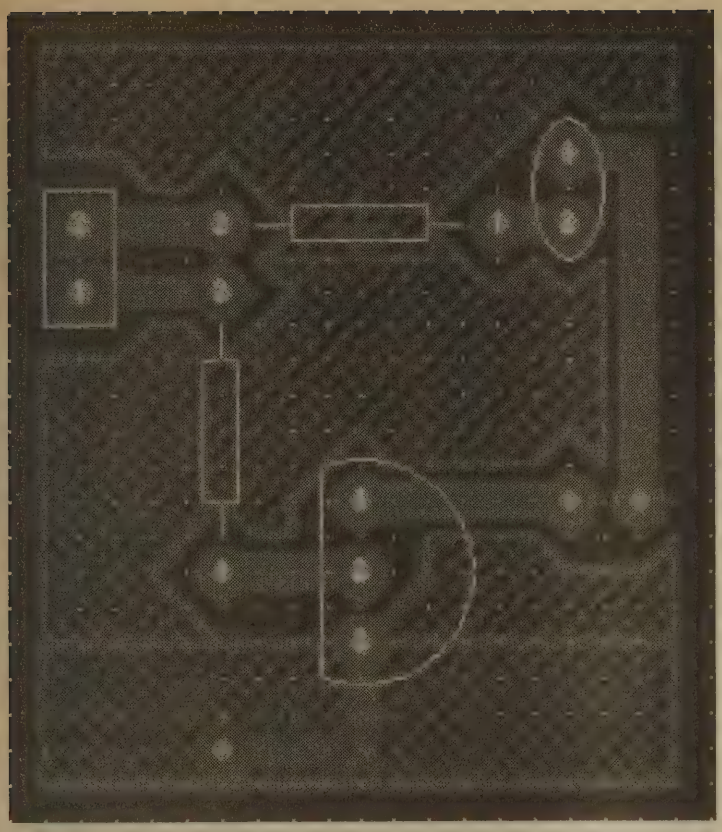
When you click the Pads Button, the top two rows of Tool Box buttons change to new buttons (in fact, this has happened before, but it wasn't important at the time). The top left button in the Tool Box is for circular pads and the third button is for standard IC pads. The circular pad I recommend is C-80-30, a round pad with an 80 mil outside diameter and a 30 mil inner diameter. If you use a significantly smaller outside diameter pad, it will probably tear out when it's drilled. The IC pad is different; it comes in only one side. However, you still need to check that the IC pad has the proper orientation; or they will short out the pins of the IC.

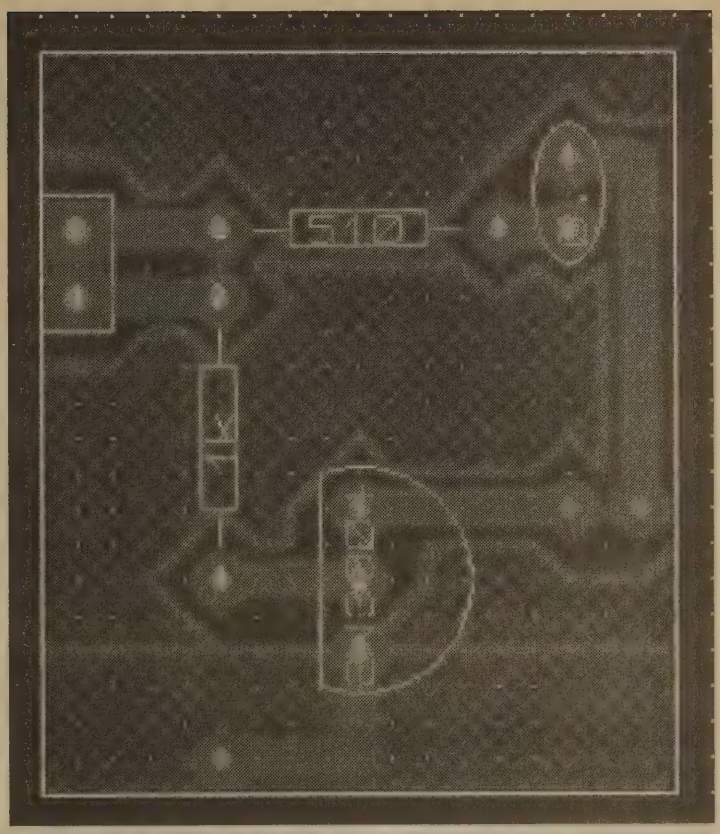
Using pads with an inner diameter (donut shaped) makes it easier to drill holes in the PCB. Because without a starting hole, the drill bit tends to wander over the pad before it begins cutting the hole.

Step 6, Adding Ground Plane
This step is not strictly necessary; however, I strongly encourage it. Adding ground plane is important for the proper operation of RF circuits and it reduces the etching time for a PCB. Ground plane is a copper region left on a PCB where no traces are needed. They connect to ground traces at some point and never touch other traces (or else they'll cause shorts).
[image: next page]

Click the Zone Button and verify the PCB layer is on the bottom (the ground plane will be blue). Large rectangular regions are covered by clicking, holding, and dragging the mouse. When the left mouse is released, a region of copper plane is left behind. The PCB's ground plane can be built up one small rectangular region at a time.

Ground plane in odd shapes is created by clicking the mouse





every time the angle of the ground plane border changes. The last mouse click must occur at the starting point to close the ground plane. Don't cross over the edge of the ground plane with another edge. Doing so confuses Ares Lite and you'll receive the message, Self-intersecting polygons not allowed.

Step 7, Adding Documentation

After you've etched and drilled your PCB, you're ready to start soldering it, or are you? Do you remember which component goes where? That may not be a problem for this simple PCB, but if you're PCB has 10 different resistors or one that was etched last month, can you remember which resistor goes where? This is why we document the PCB design in Ares Lite. What labels to write on components depends of the PCB design and your preference. For a simple PCB, just label each component with its value. A PCB with many components is often labeled with text like R1, C1, and Q1. Elsewhere, the values of the components are documented.

Text orientation is changed with the Rotate Button in the Tool Box. And it should be on the top layer since that's the PCB layer with the components. To label a component, click the center of its drawing and the label window will open. Enter the text in the window and then select the justifications of center and middle.

Next Time

In the next issue of ATV Quarterly, I'll explain how to print a mask and make the PCB.

Resources

Ares Lite: www.labcenter.com

You can download a free, limited test version of Ares Lite to try out. Ares Lite is a part of their Proteus family of PCB design and testing software.

DALPro: **www.dalpro.net**

ATVQ

American Airlines to Test In-Flight Internet

American Airlines, the latest airline to announce in-flight connectivity services, today announced that customers can begin testing Internet access on two flights. American Airlines said it hopes to expand service to more flights in a couple of weeks.

The service, offered in partnership with Aircell, will cost $9.95 to $12.95 depending on flight length, though the test service will be offered for free. The service will be tested first on a flight from New York to Los Angeles and on a return flight.

Passengers will be able to use e-mail, IM, download video and connect to secure networks using notebooks or other wireless devices. Along with the paid service, passengers will be able to connect to American's Website, Frommer's Travel Guides and some news headlines for free.

Aircell is also working with Virgin America and JetBlue Airways to provide in-flight access solutions; JetBlue began testing e-mail, IM and some Amazon.com services aboard one of its planes in December.

ATVQ

Video Enhancer

By: Dwight Raddatz, WA9EUN Email: draddatz@gwe.net
918 Kensey Ct.
Plano, IL 60545

How many times have you received good pictures but without color and sound? Even the popular final modulated amplifiers along with some antennas have limited bandwidth or frequency response. The result, the high frequency video color burst and the subcarrier audio is attenuated.

Shown here is a simple circuit that will boost your high frequency response and help you overcome some of your station's deficiencies. Best of all, it uses inexpensive components found at the local electronics store and can be built in an evening on a vector "perf."

Circuit Description

Q1 is a linear amplifier which inverts the video signal that is applied to the base of Q2. Q2 inverts the signal and amplifies (enhances) the high frequencies by utilizing a 680 pf capacitor connected to the emitter to ground. The amplified, enhanced and inverted signal is fed to the base of Q3 along with a portion from the emitter of Q1 through the 640 ohm resistor. This bootstrapping technique produces a nice overall linear high frequency response that drives Q3, an emitter follower that produces a 75 ohm output with sufficient gain to drive video modulators. The output circuit has a phasing/comparison network to provide good video linearity. The minimum overall gain of the circuit is three.

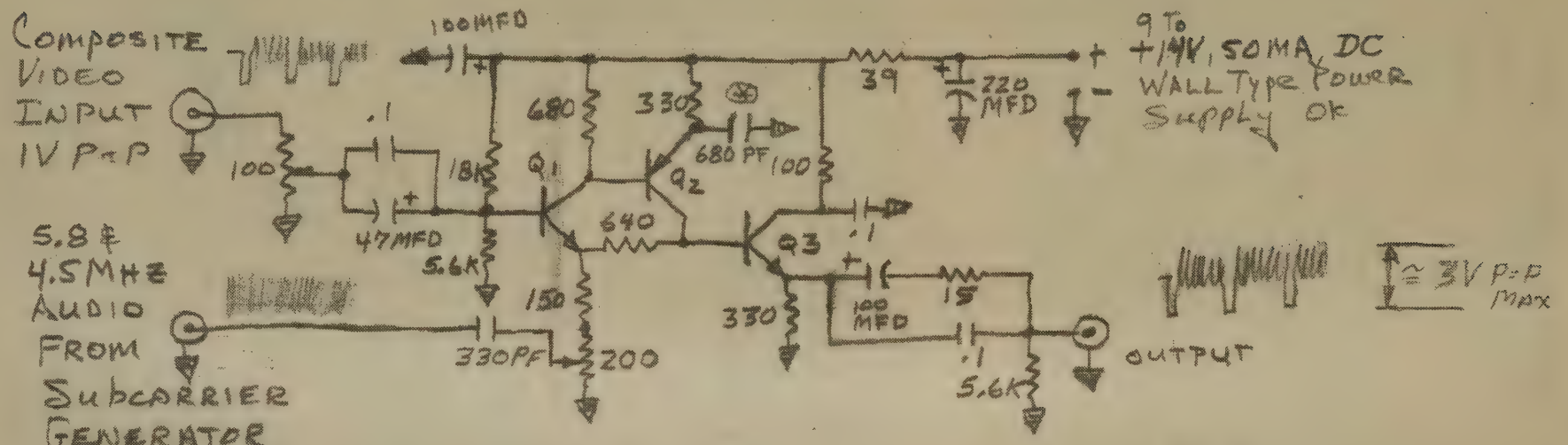
Subcarrier audio, 4.5 to 8 MHz, from a subcarrier generator such as PC electronics, will produce exceptional audio when received on a commercial TV set.

The complete circuit can be built on a 'perf' board and put in a small enclosure (2' X 3") which can be found at most local electronic stores. Some operators have incorporated the circuit in the PC Electronic transceiver. A small wall mounted power supply, if not installed in the transceiver, will power the unit nicely.

Many stations are now employing the enhancer with good results. Remember, "Hams should be seen "IN COLOR" as well as heard!" Good luck with your project.

ATVQ

-VIDEO ENHANCER & MIXER-



1 - 200 POT (AUDIO GAIN)
1 - 100 Ω POT (VIDEO)
1 - 150
2 - 5.6K
1 - 18K
1 - 640
1 - 680
2 - 330
1 - 39
1 - 100
1 - 15

3 - .1 MFD
1 - 47 MFD
2 - 100 MFD
1 - 330 PF
1 - 680 PF
1 - 220 MFD
16V CAPACITORS

Q_1 & Q_3 2N3904
Q_2 2N3906

PLACE CIRCUIT IN SHIELDED BOX

RESISTORS ¼ WATT

☒ CAN BE INCREASED TO 0.001 MFD IF MORE ENHANCEMENT IS DESIRED —

WITH 13.5V INPUT (APPROX VALUES)

Q_1 - BASE 3V
EMITTER 2.4V
COL 11.2V

Q_2 EMITTER 11.6V
COL 5.8V

Q_3 EMITTER 4.9V
COL 9.2V

WA5EUN
12/97

Wireless Push To Talk, with a Wireless Microphone (Wireless control of your ATV Transmitter)

By: Bob Miller, W6KGE Email: w6kge@yahoo.com
829 Congressional Rd.
Simi Valley, CA 93065

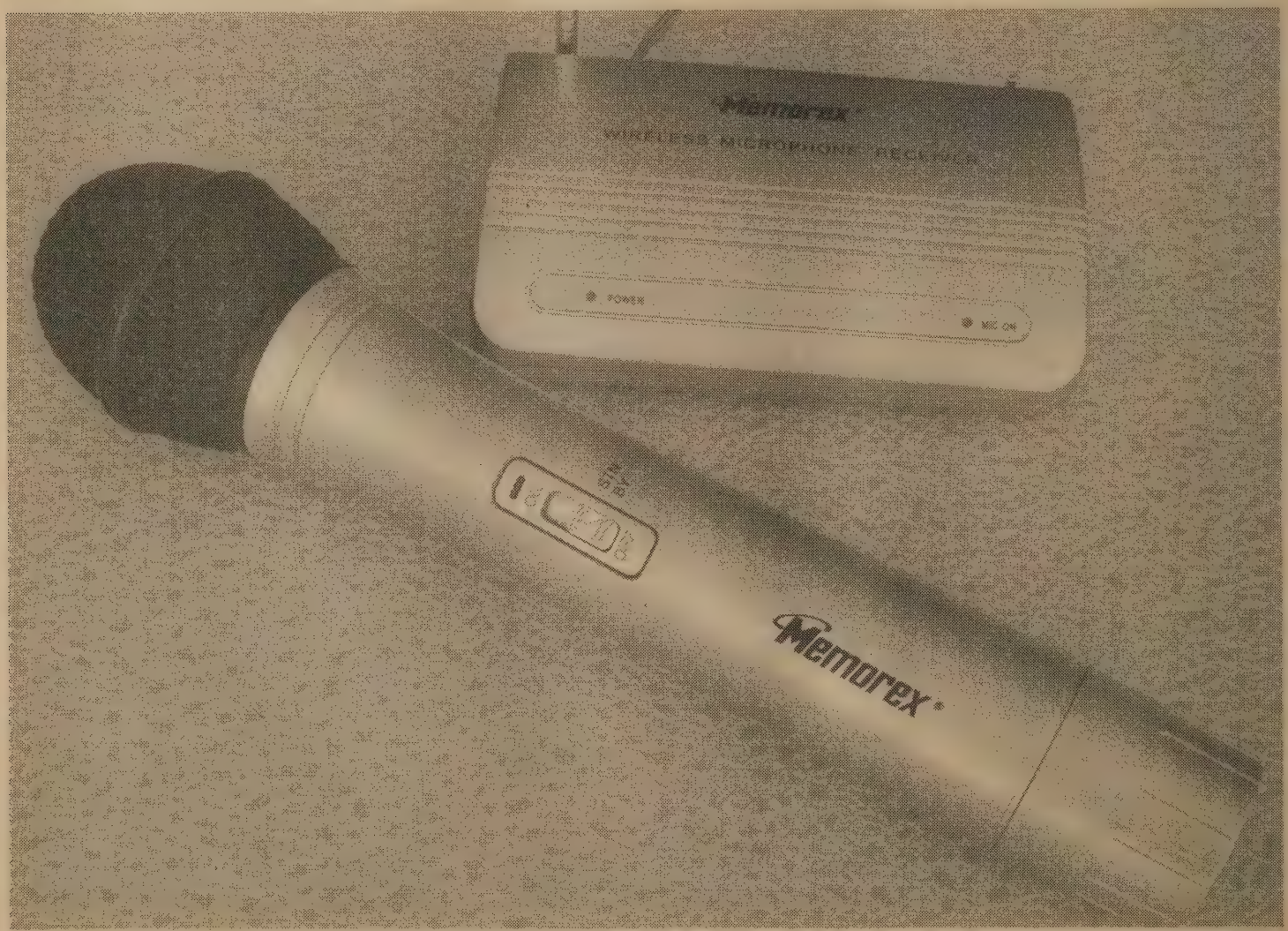
A Little Background....or 'oops ! Don't Trip on the Cord !

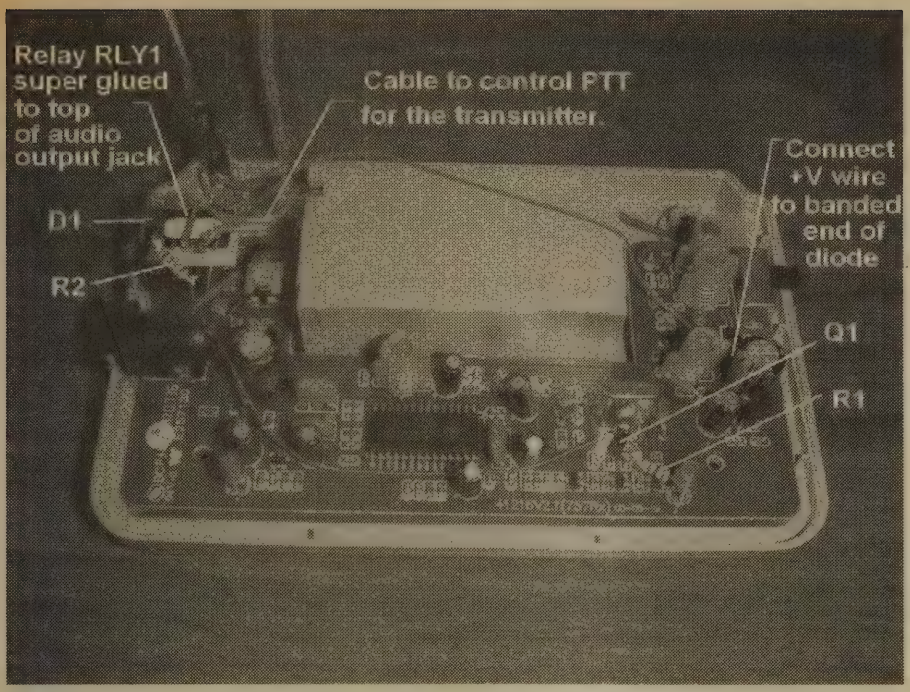
As part of this year's ARRL Field Day, we interviewed guests at the Ronald Reagan Presidential Library, and let them see themselves on ATV. We've done this in past years, but had to be very careful that nobody tripped on the microphone cords.

I didn't want to worry about the cords this year, so I bought a "cheap" Memorex Wireless Microphone (Model MKA 381) for $20 from Target. If you don't have a local Target store, this microphone is also being sold 'on line' by Target and by Amazon. It is easy to convert the microphone into a wireless microphone with ADDED wireless Push To Talk control .

Details about the Microphone

The reviews on the internet would suggest that this microphone sounds "fuzzy". The reviews, for the most part, are by people who have purchased it to use with home 'Karaoke' machines. As one of the many internet reviews explains, they don't understand that the output of the microphone's receiver is 'line' level. Plugging this into a microphone input without reducing the level, overdrives the amplifier and makes the microphone loud and "fuzzy" sounding. For a twenty dollar wireless microphone, I think the quality is quite outstanding. Remember, if you buy one from your local Target store, you can check it out before you make any modifications, and if you don't like it, you can take it back !





The microphone has a crystal controlled transmitter and a crystal controlled, double conversion fm receiver on 171.25 mHz. It worked rather well around the house. Happily, it worked well at the Field Day site with all the 'stray' RF from all the transmitters there too! We used the microphone up to forty feet away from the receiver. The microphone uses a standard 9v battery, and the receiver can use a 9v battery for portable operation, or a 'wall wart' transformer which is included. Unscrewing the wind screen reveals a rather substantial mic element structure.

The microphone's receiver has a squelch circuit to prevent noise from a weak signal, or when the microphone is turned off. A LED on the receiver lights whenever the microphone is 'on', or in the 'standby' position. The 'standby' position enables the transmitter, but keeps the microphone muted. The switch is in a good location, so you can hold the microphone normally, and easily operate the switch. I wired a very simple circuit to this LED to control the Push To Talk function on my ATV transmitter, and was able to 'wander around' and talk with visitors and control the transmitter with the wireless mike.

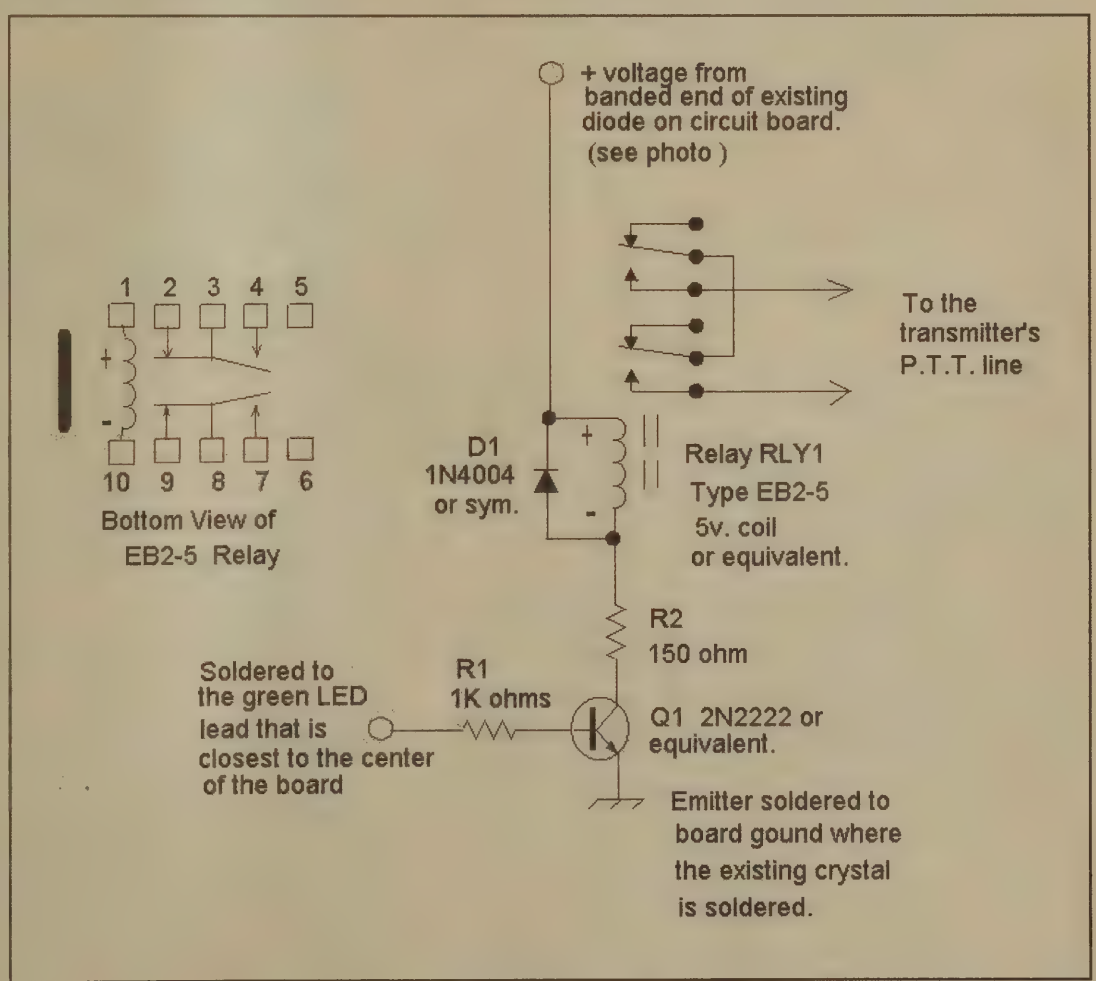
Modifications

All of the changes are made to the microphones receiver. Nothing in the microphone is changed. Start by turning the receiver upside down. Carefully remove the four self-adhesive foam feet. Remove the four screws that are hidden under these feet to take the enclosure apart.

Carefully drill a small hole in the enclosure for the Push To Talk cable. (See photo.)
Find a location for the relay that is away from any of the slug tuned coils. I used a very small amount of 'super glue' to mount the relay on the audio output jack. If you use this location make sure that the glue does not get into the interior of the jack. A dab of 'hot melt' glue might be a better choice. Try to route the '+V' wire, and the wire between Q1 and the relay, away from the coils. (See photo.)

If you use the EB5 series relay, remember that these small relays are polarity sensitive. Wire the "+" end of the coil as shown on the schematic.

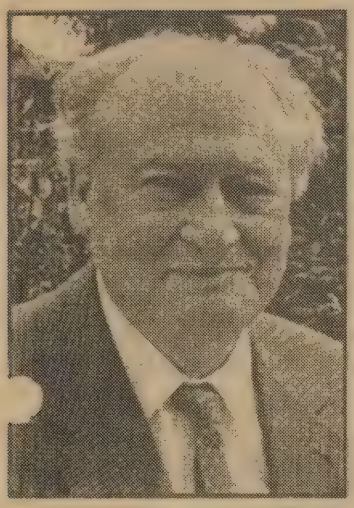
ATVQ



Making the

"Mr. PAL" Walter Bruch 100th Birthday

From TV Amateur Nr. 148
Translation by: Klaus Kramer, DL4KCK



Dieter Hurcks (www.funkempfang.de) had an interview with Walter Bruch in 1984 for the newspaper "Neue Presse" (NP) in Hannover. Walter Bruch died there later in 1990.

"Prof. Bruch being 76 years old is still engaged in current topics at consumer electronics. How does he evaluate his follower´s situation?

NP: How much liberty had researchers in your best years, and what about today?

Bruch: The work of an individual researcher like in the early days of television is not possible any more. With ICs and microprocessors today you are dependent of the mass producer to deliver it, and the inventor needs a team and much money.

NP: But not every idea leads to a product.

Bruch: Right, that is often a question of self-assertion. The developer has to get money from a management, that is far away mostly, with "Telefunken" this was "Thomson Brandt" in Paris.

NP: Small enterprises have no big chances any more?

Bruch: Even "Grundig" building the only European video-recorder (Video2000) needs such an amount of money, that they are not able to cope with it. Now "Philips" has the power there like with "Loewe" and "Marantz" too. Freedom of research is only possible at universities now, but what if no one produces the result afterwards? I have the feeling that contacts between college and industry are insufficient.

NP: Is that a reason for the Japanese technology lead?

Bruch: In Japan only things with a market-chance are developed, and their success is based on team work. An example: a new device from Europe shall be produced also by a Japanese company. Now developer, designer and salesperson will meet and discuss the concept. Here in Europe the device is produced already before the salesman can deny any market chances...

NP: What about team work in your best years?

Bruch: We have discussed who is able to do what, and in the end I have assigned the task to each team member. That was a democratic process with a decision by the leader - a mix of collective and authority.

NP: How can the German Consumer Electronics Industry attach to progress again?

Bruch: By more contact between top and bottom, also by identification with the company. If a Japanese student starts working after graduation, he will stick a company badge to his jacket as a family member. If this family has bad days, he will work for 80 hours a week if needed. If my colleges wouldn't have worked hard in those days, I wouldn't have been able to achieve all the progress (with PAL)."

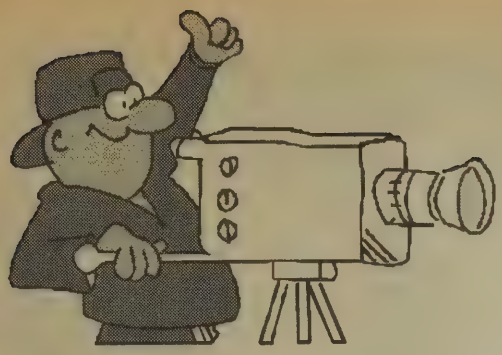
ATVQ

Sao Paulo 1968

Prof. Bruch and XYL with his team of Telefunken and Philips employees during early PAL tests via TV satellite in South America. Uwe DJ8DW received the photograph personally from Prof. Bruch in 1984 during his visit in Uwe´s laboratory at Philips Eindhoven (Netherlands).

On The Web

I had intended to include an article entitled **"DTV Converters - A Review of Sorts"**, but did not have space. I will complete this article and post it on **http://www.hampubs.com/atv.htm** . It will have comments from others and my comments about what I purchased.



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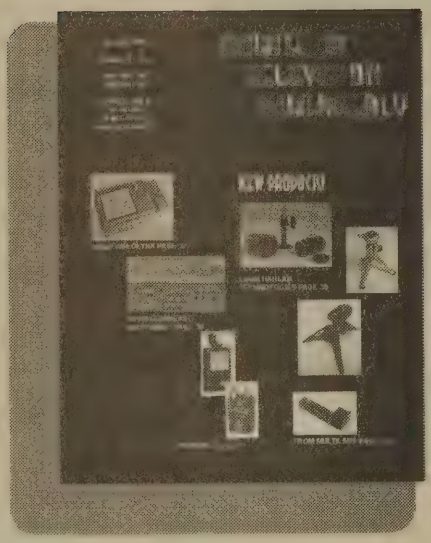
3 years	$55	$61	$84
4 years	$71	$80	$111
5 years	$87	$99	$136
Life	$399	$439	$579



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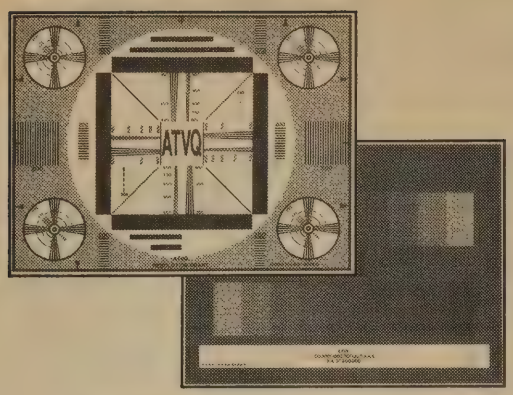

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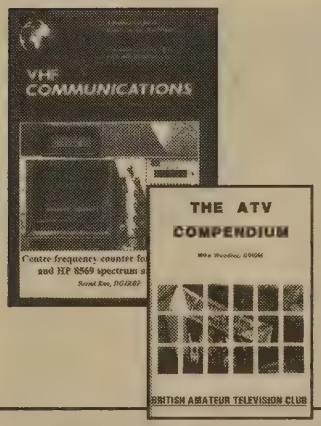

VHF Communications

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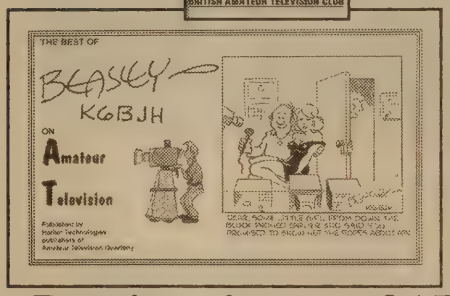

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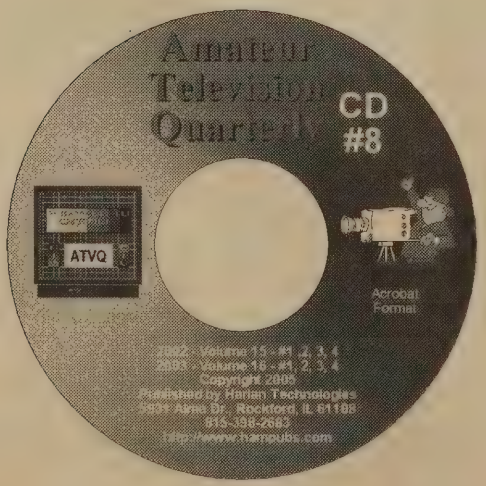

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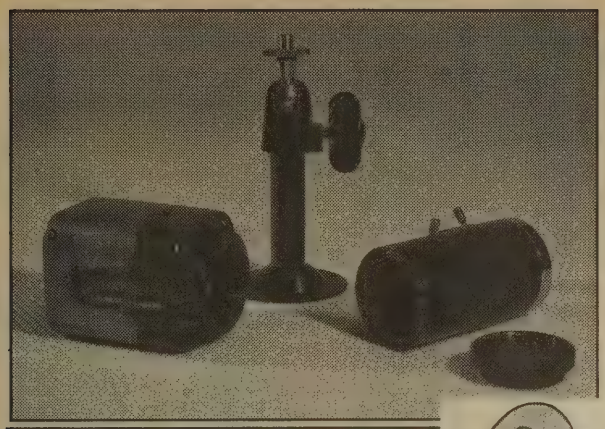

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With Varifocal Lens (6-15 mm - f1.4) and Stand!
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NTSC
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1 Vp-p 75 Ohm
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Power - 12V±10% DC - 100 ma.
Small size - 40x40x54mm
Power supply and cables not included.

Complete package Only
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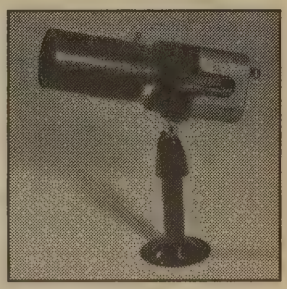

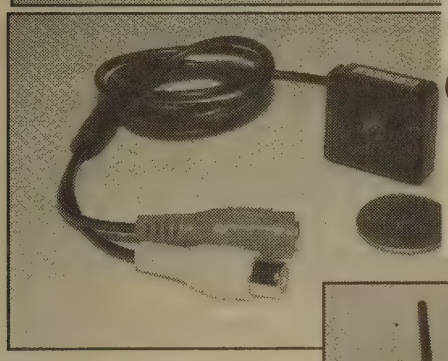

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Power - 12V±10% DC - 100 ma.
Small size - 40x40x54mm
Power supply and cables not included.

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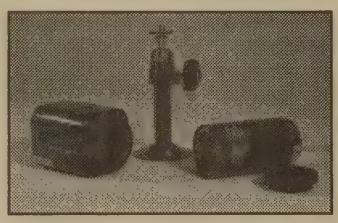

Minature Pinhole Color Camera

Color CCTV Camera - DV-3225CP1
Sharp 1/3" CCD
NTSC - 420 Line
1.0 Lux - 1 Vp-p 75 Ω
Auto White Balance
S/N Ratio - More than 46 db
Electronic Shutter - 1/50-1/100,000 Sec
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Power - 12V±10% DC - 100 ma.
Small size - 25x25 mm
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Your choice
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Minature Wireless - 2.4 GHz Color Camera

Color CCTV Camera - DV WX-3334C
Four Frequencies on 2.4 GHz
Sharp 1/3" CCD - NTSC - 420 Line
1.0 Lux - 1 Vp-p 75 Ω
Auto White Balance
S/N Ratio - More than 46 db
Electronic Shutter - 1/50-1/100,000 Sec
3.6 mm board lens
Power - 12V±10% DC - 100 ma.
Small size - 34x34 mm
Power supply and cables not included.

Water-Proof Color Camera

Color CCTV Camera - DV-262CW
Sharp 1/3" CCD
NTSC
420 Line
1.0 Lux
1 Vp-p 75 Ω
Auto White Balance
S/N Ratio - More than 46 db
Electronic Shutter - 1/50-1/100,000 Sec
6.0 mm - F1.2 lens
Power - 12V±10% DC - 100 ma.
Small size - 25x25 mm
Power supply and cables not included.

$119.00
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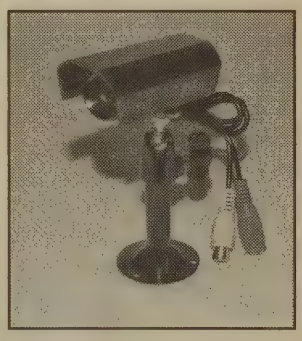

If in Illinois - add 7.25% tax
Shipping in USA $10.00 per camera, cable, tripod combination

12 Volt - 300 ma. Wall Transformer
$6.00

Video & Power 2.1 mm Cable - 25 feet RCA to BNC
$14.95
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Mini Tripod Folds to fit in pocket
$6.95

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$14.95

Connectors
F-F to BNC-M
RCA-F to BNC-M
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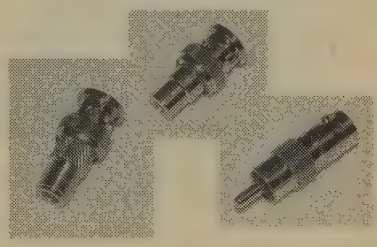
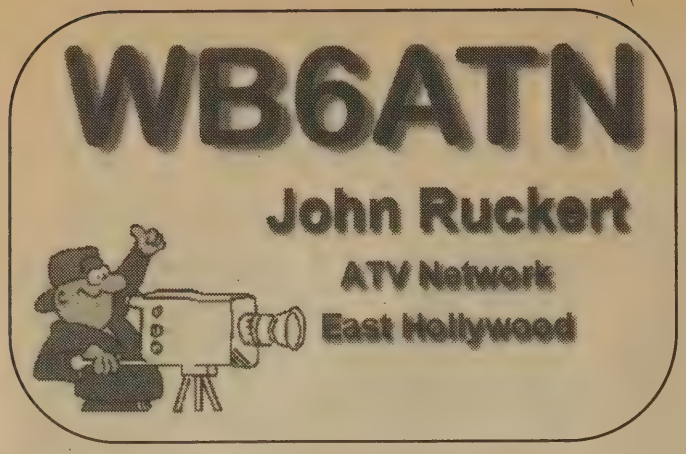
$3.00 ea.





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Terrestrial TV Channels On Demand
70 cm DATV In QPSK At DB0CD

From TV Amateur Nr. 148
Translation by: Klaus Kramer, DL4KCK

Terrestrial TV channels on demand
(Klaus Welter, DH6MAV)

At the WARC-07 we got unfavorable decisions affecting VHF/UHF channels. After deletion of VHF channels 2, 3 and 4 now the UHF channels 60 - 64 from 782 to 822 MHz (already in use for DVB-T) have to be evacuated. This means a loss of one DTV multiplex for the German broadcasters. The channels have been examined for compatibility with new radio-services like aeronautic navigation and satellite broadcast only after allocation to digital TV. Jan Outters from IRT Munic: "That was a political decision, normally you have to study first..."

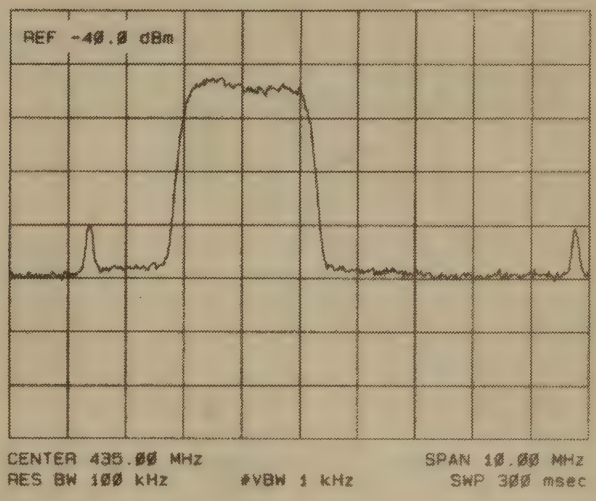
DVB-T2 in France
Already in autumn 2008 our neighbor country will start HDTV broadcasts in mode DVB-T2 (terrestrial). In Germany this switch to DVB-T2 would lead to yet unknown consequences, and the new DVB-H standard needs some channels too.

Austria spilling over the border
In southern Germany some people are enjoying the Austrian DVB-T transmitter on channel 49 installed on the highest German mountain "Zugspitze" in October 2007. Here three ORF (public) programs and one commercial program (named ATV) are broadcast even up to Landsberg/Lech over 65 km, but are not receivable in Munic (91 km). The directional antenna needs horizontal polarization opposite to vertical mostly in use all over Germany. This seems to be another way of uncoupling the Germans after the former reduction of transmitter power at the stations along the austrian border. Hollywood is greeting...

Web addresses for guests with DVB-T receivers at Lake Constance (HAM RADIO 2008):
www.ueberallfernsehen.de/empfangsprognose.html (Germany)
www.dvb-t.at/wann-wie-umstellen/bin-ich-schon-voll-auf-empfang.html (Austria, insert "Bregenz")
www.digitalesfernsehen.ch/versorgungskarte2.aspx (Switzerland, insert "Romanshorn") MS Internet-Explorer needed

70 cm DATV in QPSK at DB0CD

In December 2007 the Gelsenkirchen ATV repeater went on air again after a long time intermission. Because of complaints by 70 cm-SSB users it needed several talks between repeater operators, AGAF board members and telecom authority to safeguard a further operation on 70 cm in SATV mode with 2,5 MHz bandwidth and NBFM audio carrier on the AM video carrier.



But there were plans to change TX modes between AM and DATV (here GMSK because of narrow bandwidth and cost-saving FM-PA). As no commercial GMSK ATV receivers are available and only 10 prototype GMSK receivers from University Wuppertal, it was decided to use narrow band QPSK mode similar to DATV repeaters already operating in Europe.
Peter, DL9EH, donated his DATV boards from Wuppertal which worked in QPSK with at least 4 MHz bandwidth. Some internal hardware modifications enabled the digital ATV output at DB0CD to transmit only 2,5 MHz bandwidth now, and most domestic Sat-TV-receivers are able to decode this signal. The 434 MHz exciter output feeds a very linear power amplifier emitting 9 Watt rf power, the symbol rate is 2,083 Ms/s and FEC 7/8. Regular operating times for digital are 9-13 and 16-23 hours, for SATV 13-16 and 23-1 hours.

The first DATV test transmissions on 27.1.2008 resulted in QSL reports by Willy DC5QC (27 km), Peter DF4EA (12 km) and Rudolf DJ3DY (19 km). Another report by Wilhelm DC1WTH: on 1.2.2008 at 20 hours we received DB0CD on 434 MHz in DATV at DL0DZ in Emmerich (distance 62 km) with P5 and 20 dB SN. Our antenna is a 19 el. yagi by Tonna (16 dBi) at 36 m ASL, up-converter 434 - 1154 MHz homemade by DJ5OX, gain 55 dB, Sat-TV-RX Medion FTA3000.

Remark: Uwe DJ8DW from University Wuppertal reports a recent DATV TX software modification to enable QPSK with 2 MHz rf bandwidth on 70 cm. This will be available soon, watch **www.datv-agaf.de**

Amateur Television Contest 2008

Contest period 00:00z 06/01/08 to 00:00z 09/01/08

Contest goal: To raise activity and promote *long haul* contacts on ATV. **This year encourage everyone you see to enter!**

Participants must hold at least a Technician class license and be within the boundaries of North America, Alaska or Hawaii.

In case of multiple Ham occupants, they may share equipment during the contest so long as the intent is not merely to manufacture points. All occupants who enter must submit their own log.

Schedules: The use of schedules is allowed, and can be made by any means available. The use of 144.340 MHz national ATV calling frequency is also allowed and encouraged.

REPEATER CONTACTS DO NOT COUNT. Distance calculations will be between both stations in the QSO with no relay allowed.

Exchange: Callsign with at least P-1 video on any amateur band 70cm and above.

MOBILE or **PORTABLE** stations must exchange their location at the time of contact as determined by portable GPS or other verifiable means.

VIEWER: Station does not have to exchange any video but must be a licensed amateur and confirm at least a P-1 reception report to the transmitting station via 2 meters or another amateur band.

CLASSES: There will be 4 classes for participants:

HOME: Primary location of residence with Fixed Antenna structure. Minimum distance for repeat contacts (75 Miles)

PORTABLE: Station can be set up just for the contest and may not operate from any other location during the contest period. Minimum distance for repeat contacts (50 Miles)

MOBILE: Station can operate stopped or while moving but all antennas must be affixed to the mobile unit and capable of transmitting while in motion. Minimum distance for repeat contacts (25 Miles)

VIEWER: Station must be able to receive video at P-1 signal level and relay report to the transmitting station. Minimum distance for repeat contacts with this class is determined by the transmitting stations type or class.

Scoring System: Each valid contact will be awarded points for the mileage between the two stations on an ever-increasing difficulty per frequency basis as follows:

70cm = 2 points per mile
33cm = 4 points per mile
23cm = 6 points per mile
13cm and above gets 10 points per mile!

A station can be worked for points only once unless they are a minimum distance apart as specified by the class of entry. (See CLASSES) and then they may be worked once in a calendar month through the contest period.

The distance between stations will be calculated by the Maidenhead Grid and sub grid identifier coordinates listed on QRZ.com and rounded down to the nearest mile. Every effort should be made by entrants to verify or update their information before the contest starts. If you do not have Internet to look up a stations coordinates please ask the other station. If they do not know then leave the mileage column blank and it will be determined by the verifier. No changes can be made to coordinates once the contest starts unless you move.

Distance will be calculated with the (Bearing and Distance) DOS program by W9IP that is used by the ARRL for distance records.

LOG's: All logs must be in a standard format as specified below:

STATION WORKED RPT REC RPT SENT UTC DATE FREQUENCY GRID SQ DISTANCE POINTS

Your log information should also include your Name, Address, your Maidenhead Grid and sub grid identifier coordinates, and a list of equipment used. Sample Log is below and a full page Log sheets will be available on **www.hampubs.com** .

Logs can be submitted by email or regular mail and must be received by September 15th to be eligible for contest Awards. Send the logs to:

ATVQ Contest - 5931 Alma Dr. - Rockford, IL 61108 - or to: **ATVQ@hampubs.com**

If you use the **ATV Contest program** written by Charles Beener, WB8LGA, which is at **http://home.columbus.rr.com/cbeener/** , please email me the data file to **atvq@hampubs.com.**

AWARDS:

All Scores will be published in ATVQ and certificates will be awarded for the top three scores in each class. The highest overall score of the contest (The one who covers the most points on ATV) will receive the OVERALL WINNER PLAQUE

ATVQ

CALL			GRID SQ.			CLASS		
STATION WORKED	REPORT SENT	REPORT RECEIVED	UTC	DATE	FREQUENCY	Grid Sq.	MILES	POINTS
TOTAL MILES				TOTAL POINTS				
NUMBER OF DIFFERENT STATES WORKED								

The WB8LGA ATV Google Maps

http://home.columbus.rr.com/cbeener/GMapATVQ.html

By: Gene Harlan - WB9MMM Email: atvq@hampubs.com
5931 Alma Dr.
Rockford, IL 61108

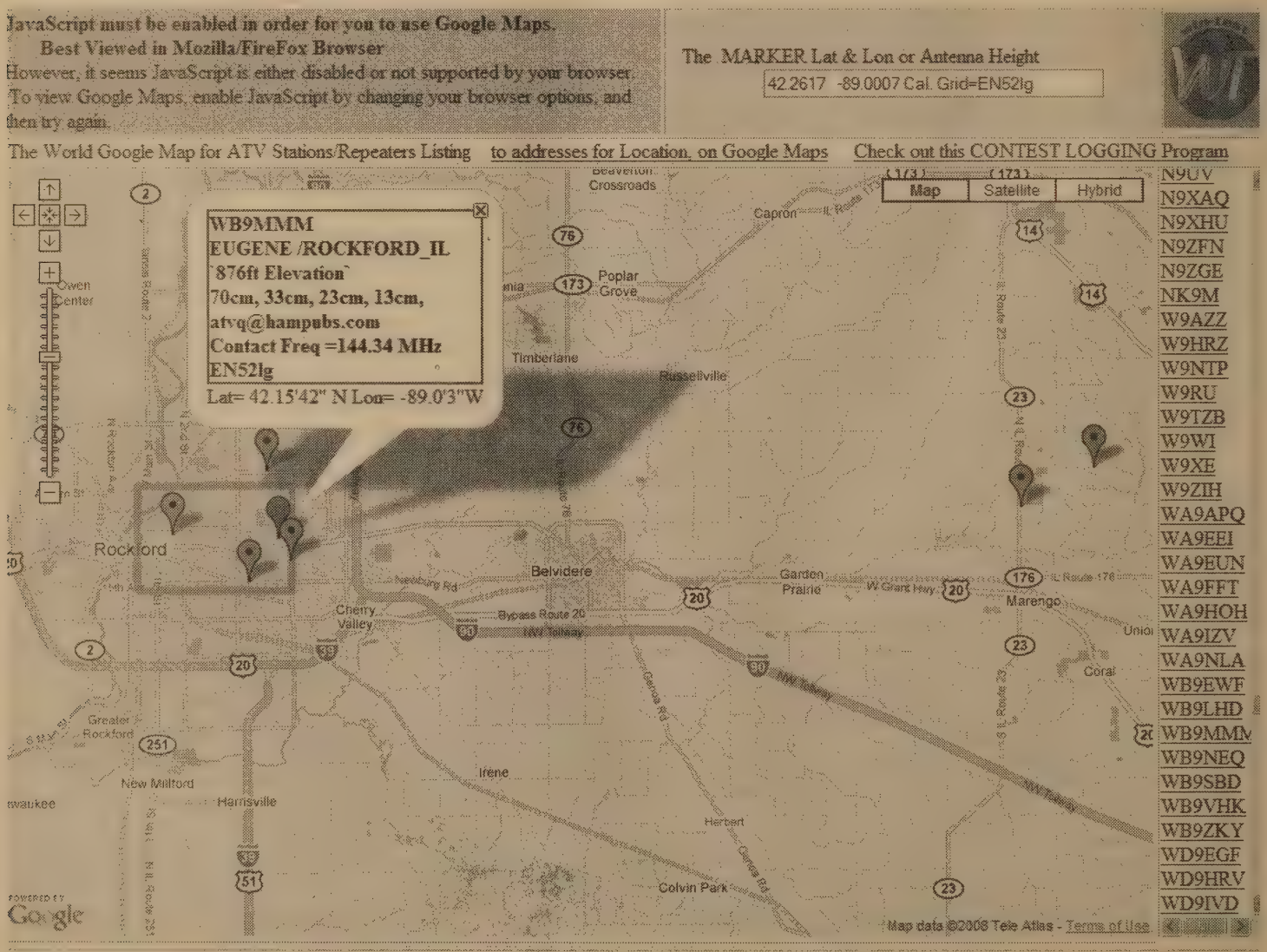
While this was mentioned in the last issue of ATVQ, I want to make sure that everyone knows how to use the maps and some of the neat features that Charles has added. I think that this is a great way for someone interested in ATV to find out if there is anyone else close to where they live to either talk with or send ATV from house to house.

The map below shows the information that can show at your location. The location is set by where QRZ says you are, so if you are in a post office box, it will not show the true location. So it will show your call sign, name, city, elevation, bands you operate, email address (if you want), voice contact frequency in your area, grid square, and Lat/Long.

To enter your data, go to the bottom of the web page where you will see what is shown in Fig 2, Enter the information that you would like to show, and press SEND. When you do, it may come up with a blank email. If so, look for a pop-up box with information to paste into the email.

When using the page, you can choose Show ATV Stations and/or Show ATV Repeaters. It can be a little slow in loading as there are many stations being loaded. The web page looks best using FireFox as opposed to Internet Explorer.

Once you have stations on the screen, you can choose what frequency of the stations to view, or All. If the user has entered the frequencies that they use, this feature will work. So, make sure



I'm trying to Make a DATA Base of ATV FastScan Hams .

Please If you havn't sent this info before enter the following info. It will be send to me VIA EMAil:

Please enter your Ham Call:

Please enter your Calling Freq:

Please Check Box for Your Bands Operated Then CLICK Send it! Button

Your Operating Bands: ☐ 70cm ☐ 33cm ☐ 23cm ☐ 13cm ☐ 9cm ☐ 10Ghz [☐ YES Have My EMail address on the Google Map]

Send it! Start over

Fig 2

☐ Check to Use Mouse Wheel to ZOOM Map? Display any Call with(inside text of) Call Search

Check boxes to show only 70cm: ☐ 33cm: ☐ 23cm: ☐ 13cm: ☐ 9cm: ☐ 10Ghz: ☐ All: ☐ Unknow: ☐

Fig 3

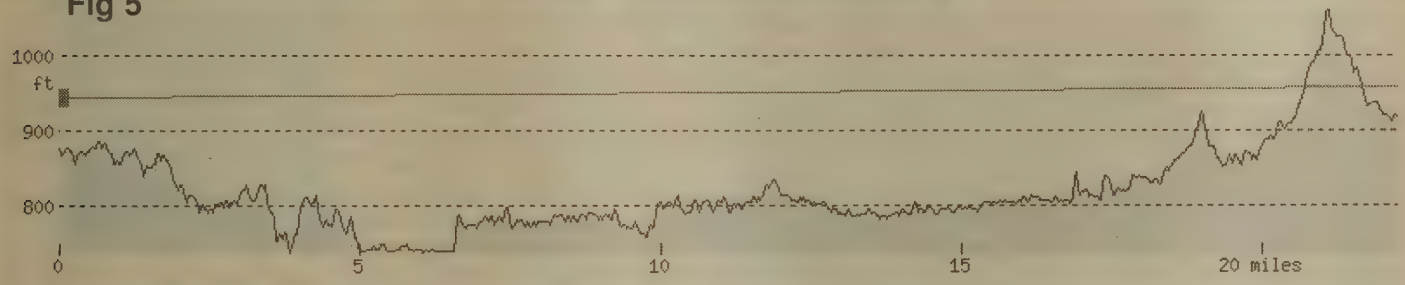
Fig 4

Show Path Profile Show Curve Path Profile For more information visit HeyWhatsThat.>

Antenna Height (Green Marker) Left Station 70 Antenna Height (Red Marker) Right Station 40 ☑ in Ft. ☐ in Meters

http://home.columbus.rr.com/ - Here is the Profile for ATV - Windows Internet Explorer

Fig 5



- WB9MMM Ant. at 986ft Elevation 22.5Miles_83_Degrees_263_Degrees_Rev to N9RF Ant. at 942.2ft Elevation

Close Window

For more information visit HeyWhatsThat.>

and keep Charles updated so he can update your marker with the proper information.

It seems like I keep coming up with ideas and Charles keeps up with me by putting them on the site. One of the ideas that I think is really neat is to be able to pick two stations and get information such as distance, direction, and even a path profile! The reason that I had suggested this is that our local repeater has a 1.250 GHz input and I wanted a tool that would show the path so stations could see their chance of getting into the repeater.

Then, when he had that done, it was from ground level, so I suggested that there should be a place to enter the height of the tower on each end. Charles, again added the capability and it is shown in Fig 4.

To show an example, I picked my QTH and the QTH of N9RF as I knew there was a ridge in that area.The result shows in Fig 5.

So, I wanted to make sure that everyone understood all the features that are on this page. I hope that everyone will take advantage of what is here and enjoy the features.

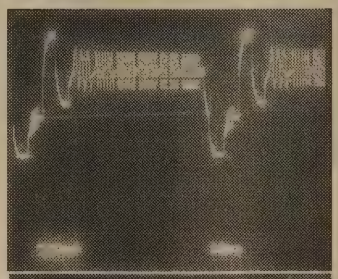
ATVQ

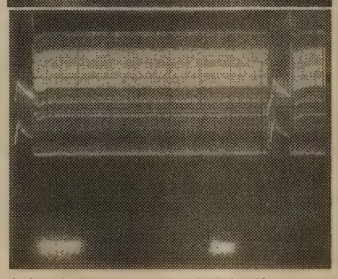
From the April 2008 ATCO Newsletter

By: Art Towslee, WA8RMC

COMTECH 1200 MHz TRANSMIT MODULE IMPROVEMENTS

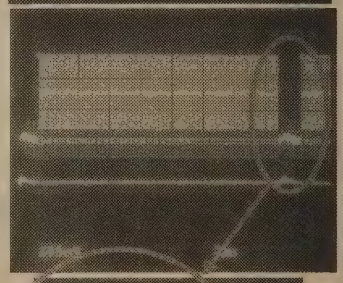
For quite some time now I, as well as others, have known that the video quality in the Comtech transmit and receive modules have problems. The G1MFG modules from Giles correct some of them in the "Gold and Platinum" boards but not all. Since the modules were intended to be used as a pair and not designed for use in the USA, problems arise when we try to use them with the NTSC TV format in repeater service. I became aware of the severity when I used an FM1394TSIM transmit board in our ATV repeater. I was able to clean up the video response problems but never able to boost the low frequency response. As a result, the vertical sync was distorted causing most receivers tuned to the 1250MHz channel to roll. I recently re-visited the issue and, I believe, resolved all of the deficiencies. The following steps will bring this module up to "near broadcast" standards. (The receiver module improvements will be described in a later ATCO Newsletter).



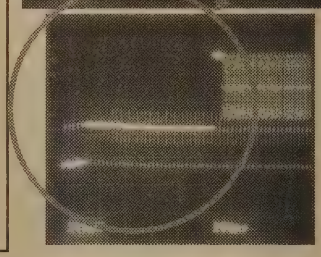


Horiz. waveform before (left) & after (right). Slight rolloff of high freq. in multiburst waveform is intentional to limit overall bandwidth.

The "before" vert. waveform on left has severe tilt causing rolling in received picture. The corrected vert. waveform still shows some sync tilt but the receiver likes it now.

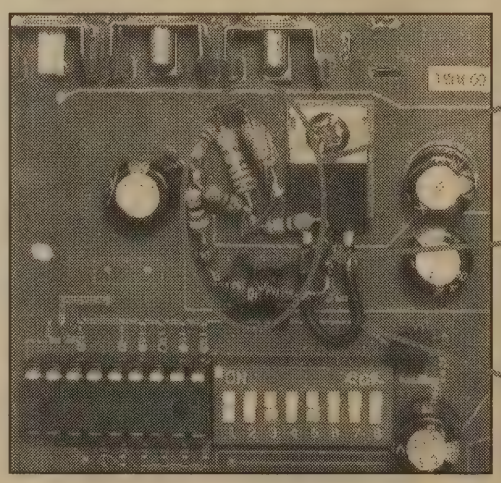


The expanded vertical sync interval is shown to illustrate it is not as bad as it first looks in the above photo.



There are 4 basic areas to enhance. First, a proper pre-emphasis filter must be added to the input. It can be installed in the area occupied by removing the video gain pot on the main board. Next, inside the module the 100 pf and 2.7k resistor parallel combination must be jumpered out. Third, a .01 mf capacitor must be added across the 39 pf loop compensation cap inside the module. Last, add a 0.5 mf capacitor across the 1.0 mf loop compensation cap at pin 1 of SP5055 IC in the module. Details are pictorially shown below and treated in detail by Barry, VE6ATV, on his web site, http://ve6sbs.sbszoo.com/ve6atv/platinum/mods.htm. The added 0.01mf and 0.5 mf caps in the module are the same as Barry describes but the pre-emphasis filter and bypassing of the 100pf cap and 2.7k resistor combination are new here.

- **Pre-emphasis filter addition** – First, remove the video gain pot on the board next to the regulator. It is not needed because there is another one inside the module can. In the space now available, add the filter components using the pot pc pads as the filter input and output. I used the regulator center pin as the ground point as shown in the picture but you can just as easily use the remaining pot pc ground pad. The 470mf video coupling cap is not needed and could also be removed for additional space but it doesn't change the video response either way so I left it in. The components are standard values and tolerances except for the inductor. The inductor is an 18 microhenry coil which can be purchased or hand wound as I did. Use 22 turns of #26 enameled wire on a ferrite core.

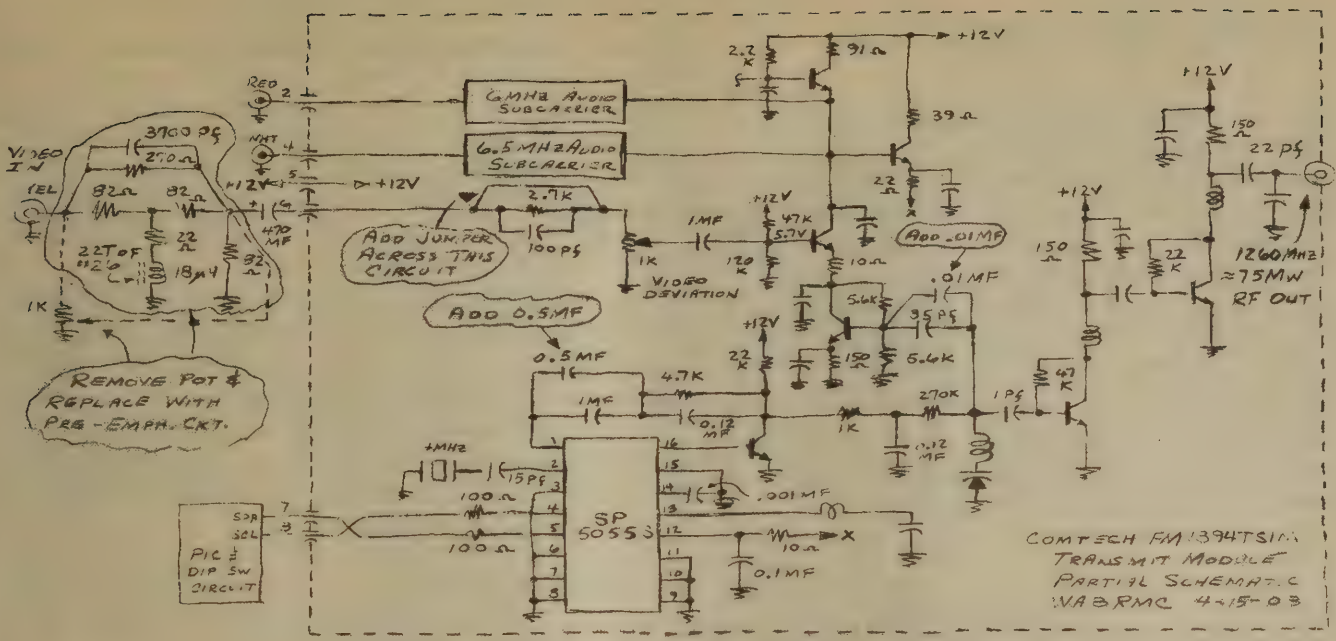


Pre-emphasis filter parts. Note 470mf cap to the left and regulator to the right.

Ground tie point. (reg. center pin)

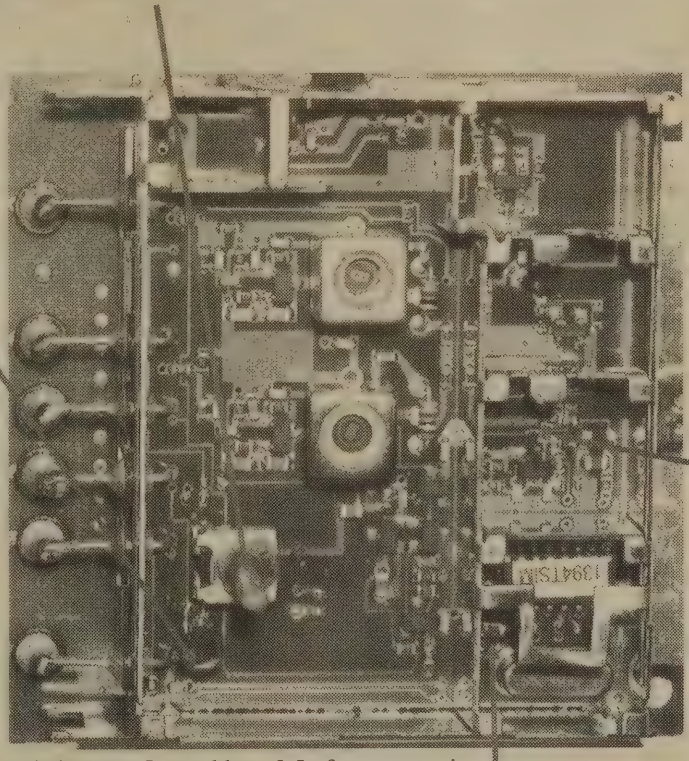
Regulator input-output bypass jumper.

Notice that I also jumpered the regulator input to output. This is required only if you feed the board with regulated +12vdc. If you use a 15vdc "wall wart" or equal, the regulator is still needed. Just remember to provide enough input voltage (+15vdc) for the regulator to work properly. The pre-emphasis filter schematic is shown below.



COMTECH TRANSMIT MODULE PARTIAL SCHEMATIC

Note: You may see an object on the module internal video deviation pot. I glued a small rod to the top of the pot so I could adjust the deviation without opening the module top can. That is your option.



- **Install jumper across R-C parallel combination** – There is a video peaking circuit inside the module adjacent to the internal video modulation potentiometer. It is not required or desired when the pre-emphasis filter is installed. In fact, the video gain lost by the pre-emphasis filter is more than compensated by removing this R-C combination. It is simplest to simply install a small jumper wire across these parts. Do not risk circuit board damage by removing them.

- **Change PLL charge pump capacitor** – This capacitor (and the cap below) affects the PLL charge pump response time. I measured a 1.0mf unit here but may be a different value in some boards. In any case, if the cap below is changed to 0.01mf, this cap must be at least 1.0mf to prevent jitter in the received picture. I recommend changing the 35pf cap below and observe the received picture. If it is stable for all lighting conditions, leave this cap alone. My G1MFG unit had a measured value of 1.3mf here with a stable picture so I left it alone. This cap is located in the compartment with the crystal. Access can be obtained by bending the U shaped frame piece out of the way but, caution, if you are not used to working with surface mount parts, leave it to someone else or…don't do it! Don't try to remove the existing cap. Just solder a 0.5mf cap across it.

- **Change phase lock loop compensation capacitor** – The PLL compartment contains a 35 pf capacitor which determines the PLL response time. For whatever reason, it is adequate for higher frequencies but over reacts to long duration changes. In any case, increasing this value to about 0.01mf corrects the low frequency vertical interval problem. Another cap must also be changed but we'll handle that one next. The cap in question is a small surface mount cap that is easily destroyed by someone not used to working with surface mount components so be careful! If you're unsure, have someone competent in this area do it for you. It's best to just solder a 0.01mf surface mount cap on top of the existing one without removing the existing cap. Note: if you are working with a G1MFG "Gold" or "Platinum" board, this change may already have been made. My Gold board had a 1000pf cap in this location so I removed it and replaced it with a 0.01mf cap. I don't know what is in the Platinum boards.

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Payment for Technical Articles

ATVQ will pay for certain articles that it publishes. I will outline the policy here, but it will be subject to change as needed to make sure that ATVQ continues to be an ongoing publication. ATVQ will pay $25.00 for technical articles that are published and are a minimum of 2 pages. While this is not a great amount, I hope it will encourage more technical type articles to be written. Exceptions will be articles that are written by a manufacturer/seller of equipment that is being written about. While I do not want to discourage this type of article, the article itself is an advertisement of the product. Articles from clubs will be encouraged, and I would expect they would like to share their information with the ATVQ readership. Information gathered from the Internet will not be paid for and is mostly small filler items.

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CONTRIBUTORS GUIDE

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Articles can be sent to:
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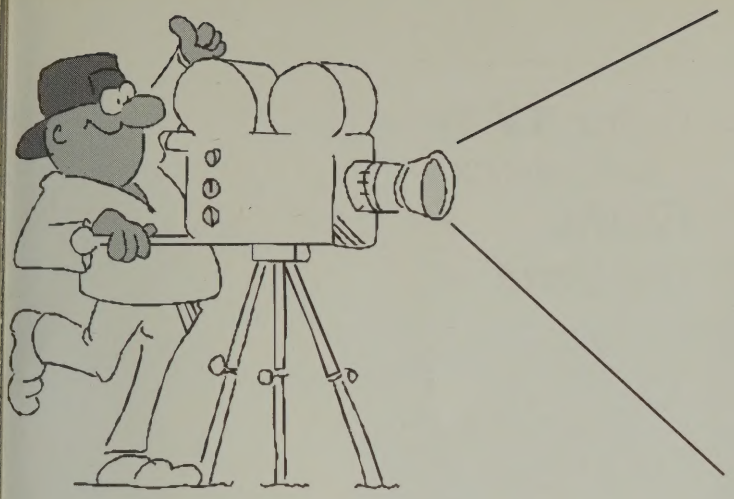

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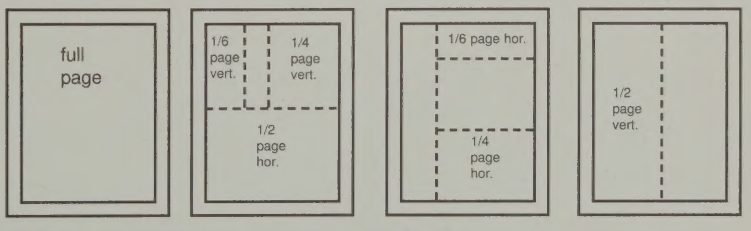

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